CHAPTER SIX

PRESENTATION AND ANALYSIS OF THE RESULTS

6.1 Introduction

The previous chapter detailed the research methodology thus followed. This chapter presents the results of the study from the analysis of the questionnaires. The following section of this chapter presents a description of demographic characteristics of respondents. Then, section three presents a detailed presentation of research results for the main and sub questions of the study put forward in chapter one. The chapter concludes with a summary of the main findings related to each question of the study.

6.2 Demographic characteristics of the respondents

Section one of the questionnaire sought to describe some of the demographic characteristics of the respondents. These characteristics include; age, educational level, managerial level, working experience in personnel department, and working experience in information technology and systems. The following table shows the demographic characteristics of respondents.

Table 6.1 Demographic characteristics of respondents

Descriptive Statistics	Description	Frequency	Percentage
Age	Less than 25 years	9	9.8
	26-35 years	47	51.1
	36-45 years	25	27.2
	More than 46 year	11	11.9
Level of education	Diploma or less	40	43.5
	Bachelors	47	51
	Master Degree	3	3.3
	PhD Degree	2	2.2
Managerial level	Manager	5	5.4
	Vice / Assistant manager	3	3.3
	Head department	23	25
	Employee	61	66.3
Years of experience in HR Department	Less that 5 years	34	37
	6-11 years	30	32.6
	12-17 years	12	13
	More than 18 years	16	17.4
Years of experience in Information Technology and Systems	Less that 5 years	54	58.7
	6-11 years	29	31.5
	12-17 years	5	5.4
	More than 17 years	4	4.3

Note. N= 92

As Table 6.1 shows, regarding the age of respondents, the average age of the respondents was between 26-35 years with frequencies of 47 and percentage of 51.1%. Followed, was the average age of 36-45 years with frequencies of 25 and percentage of 27.2%. The least frequencies were for the age less than 25 years with frequencies 9 and percentage of 9.8%.

Regarding the educational level, of the 92 respondents, the majority of the employees reported to have a Bachelor's degree (n = 47; 51.0%), followed by a Diploma or less degree (n = 40; 43.5%). While the least frequencies were for those respondents who have PhD degree with (n=2; 2.2%).

With regard to the respondents' current position in the HRM department, it was found that the majority of the respondents are staff (n = 61; 66.3%), followed by head department (n = 23; 25%), manager (n = 5; 5.4%), and the least frequencies for assistant manager (n = 3; 3.3%).

For working experience in HR department, most of the respondents indicated that they had worked for less than 5 years (n = 34; 37%), followed by 6-11 years (n = 30; 32.6%), followed by more than 18 years (n = 16; 17.4%), and the smallest number of employees stated that they had been working in the HR department for 12-17 years (n = 12; 13%).

Regarding the years of experience in information technology and systems, most of the respondents indicated that they have less than 5 years (n=54; 58.7%), followed by 6-11 years (n=29; 31.5%), followed by 12-17 years (n=5; 5.4%), and the smallest number of employees that have experience in information technology and system more than 17 years (n=4; 4.3%).

6.3 Results in relation of the research questions

The main questions for this study were stated in chapter one of the thesis as follows:

1) What is the current status (planning, designing, operating, and maintaining) of Human Resources Information Systems at Jordanian public universities?

2) What are the specifications and features of Human Resources Information Systems at HR departments at Jordanian public universities?
3) What is the extent of applying Human Resources Information Systems in HRM functions at the Jordanian public universities?
4) What are the obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities?

Issues that pertain to each question listed above are placed together and discussed in the next chapter in relation to the literature reviewed in earlier chapters.

6.3.1 Results related to Question One: What is the current status (planning, designing, operating, and maintaining) of Human Resources Information Systems at Jordanian public universities?

The first main question of this study is designed to investigate the current status of HRIS at Jordanian public universities. To answer this question, frequencies and percentages of the employees' responses on each of items related to the current status (planning, designing, operating, and maintaining) of HRIS in these universities, were computed as shown in Table 6.2 below:

Table 6. 2 Frequencies and percentages of participants' responses on 'Current status of HRIS at Jordanian public universities'

No.	Item	Response	Freq.	%
6.	Which of the following departments is responsible for operation and maintenance of HR technologies at HRM departments?	HR department	2	2.2
		Computer Center at the University	55	59.8
		Joint Computer Centre & HR	35	38.0
7.	Which of the following departments is responsible for design and development of the new HR technologies at HRM departments?	HR department	4	4.3
		Computer Center at the University	50	54.3
		Joint Computer Centre & HR	38	41.3
8.	Which of the following departments is responsible for setting standards of computer software and hardware for HR departments?	HR department	5	5.4
		Computer Center at the University	62	67.4
		Joint Computer Centre & HR	25	27.2
9.	Which one of the following budgets is charged for the cost of activities associated with HR technology?	HR department's budget	18	19.6
		Computer Center at the University	12	13.0
		General budget of the university	62	67.4
10.	Who participates actively in planning the needs of HR information technologies?	HR department's staff	20	21.7
		Computer Center's staff at the University	12	13.0
		Joint Computer Centre and HR staff	60	65.2
11.	What is the time horizon used for HR technology planning?	One semester	4	4.3
		One year	10	10.9
		No specific time	78	84.8

(n=92)

It was found from the above table that:

- Computer Centre at the university is the most responsible department for operating and maintaining IT used at HR departments at the universities, with a frequency of 55 and a percentage of 59.8%.
- Computer Centre is the main unit at the university that is responsible for designing and developing new IT used at HR departments, with a frequency of 50 and a percentage of 54.3%.
- Computer Centre at the university is the most department responsible for setting standards of computer software for HR technologies used at HR departments at the universities, with a frequency of 62 and a percentage of 67.4%.
- The general budget of the university is the main budget which is charged for the cost of activities associated with HRIS used by HR departments, with a frequency of 62 and a percentage of 67.4%.
- Computer Centres and HRM staff jointly participate actively in planning the needs of HR information technologies for HR departments, with a frequency of 60 and a percentage of 65.2%.
- There is no specific time horizon used for HR technology planning for HR departments, with a frequency of 78 and a percentage of 84.8%.

Testing Proposition 1:

Proposition 1 stated that "Human Resources Information Systems prevailing at Jordanian public universities are well managed, operated, maintained, and planned".

According to the above calculations of frequencies and percentages of participants' responses on 'Current Status of HRIS at Jordanian public universities', Proposition 1 is accepted.

6.3.1.1 Summary of results related to Question One

The results of this question described the current status of HRIS at the nine Jordanian universities surveyed. It can be concluded from the findings related to this question that the Computer Centre at each one of the nine universities is playing a major role in the management of HRIS. It is the main responsible unit for designing and developing new information technologies used by HRM departments at these universities. In addition, it plays an essential role in setting standards of computer software for HR technologies used at HRM departments, and operating and maintaining these technologies frequently. The cost of activities associated with accessing, operating, and maintaining HRIS used at HRM departments is calculated from the general budget of the university. Regarding planning processes of HRIS, computer centre and HR staff jointly participate in planning the needs of HR information technologies used at HRM departments. Also, regarding the time horizon of planning for new HR information technologies and other issues related to the use of HRIS, there is no specific time for this activity at each university, as it is not performed on a one month or one semester base.

6.3.2 Results related to Question Two: What are the specifications and features of Human Resources Information Systems at HRM departments?

The second main question of this study was designed to investigate the specifications and features of HRIS at Jordanian public universities. The analysis and the answers to this question, means and standard deviations of the employees' responses on each of the items, related to specifications and features of HRIS at Jordanian Public universities, are computed as shown in Table 5.3 bellow:

Table 6.3 Means and Standard Deviations of the Participants' Responses on 'Specifications and Features of HRIS' at Jordanian public universities

Rank	Item no.	Statement	Mean	Std Dev.	Degree
1	23	An accurate, updated, and comprehensive database for all university staff is available at HRM departments	2.63	.722	High
2	24	There is coordination between HRIS and other MIS at different units and departments of the university	2.49	.734	High
3	21	HRIS are easy to operate and manage its software applications by HRM staff	2.46	.818	High
4	25	HRM department has a security system for HRIS that allow access to HRIS only to authorized users	2.34	.816	High
5	17	Manger Self-Service (MSS) applications are used by HR managers (applications oriented toward supervisors rather than employees, e.g., salary, succession management)	2.33	.866	High
6	22	There are clear and documented procedures and steps on how to get access to all related information and reports about all university staff	2.09	.991	High
7	14	HRIS are characterized by enough speed to get access to required information at the appropriate time.	2.08	.929	High
8	12	A fully integrated HR software suite is used in HR departments for functional activities (e.g., selection, appraisal, etc. so that HR activities are computer aided)	1.97	.977	Moderate
9	15	HR Intranets are used to link different HRM departments with other units at the university	1.97	1.124	Moderate
10	13	HRM department is having the needed information technology of hardware for performing different activities.	1.92	.855	Moderate
11	16	Employee Self-Service (ESS) applications are used in HRM departments (e.g., paycheck services, financial services)	1.91	1.306	Moderate
12	20	The related information and technical specifications for HRIS are documented and indexed in a user manual that can be referred to by users of HRM departments	1.84	1.009	Moderate
13	18	HR Extranets (Internet connections that link HRM at the university with other local universities and educational institutions) are used at HRM departments	1.16	1.269	Moderate
14	19	Interactive/Automated Voice Response (IVR or AVR; telephony-based) systems are used for HRM-related transactions (e.g., salaries, training, etc.)	.87	1.197	Little
		Total	**2.00**	**0.53**	**High**

The above table shows the following results:

- Mean scores for all items of this domain are ranging from 0.87 to 2.63 with standard deviations ranging from 0.72 to 1.3, with a degree ranging from little to high.
- Item 23 which provides that "An accurate, updated, and comprehensive database for all university staff is available at HR departments" ranks first with a mean score of 2.63, and a standard deviation of 0.72 with a degree of 'high'. It has the highest mean score amongst all items of this domain.
- Item 24 which provides that "There is coordination between HRIS and other MIS at different units and departments of the university" ranks second with a mean score of 2.49, and a standard deviation of 0.73 with a degree of 'high'.
- While the item 19 which provides that "Interactive/Automated Voice Response (IVR or AVR; telephony-based) systems are used for HRM-related transactions (e.g., salaries, training)" ranks the least item with a mean score of 0.87, and a standard deviation of 1.19 with a degree of 'little'.

Are there any significant differences to means of responses related to 'HRIS specifications and features' domain according to 'name of university'?

To get answers to this question, the researcher compares between the nine Jordanian public universities. Accordingly, mean scores and standard deviations are calculated in relation to 'Specifications and Features of HRIS' domain as follows:

Table 6.4 Means and std. deviations for responses related to 'Specification and Features of HRIS' according to name of university

Rank	Name of university	N	Mean	Std. Dev.	Degree
1	University of Jordan	9	2.49	.525	High
2	Jordan University of Science and Technology	8	2.21	.469	High
3	Al Al-Bayt University	8	2.10	.362	High
4	Mutah University	15	2.09	.645	High
5	Yarmouk University	18	2.04	.581	High
6	Hashemite University	8	1.89	.445	Moderate
7	Al-Balqa Applied University	10	1.76	.485	Moderate
8	Tafila Technical University	11	1.75	.098	Moderate
9	Al-Hussein Bin Talal University	5	1.47	.337	Moderate
	Total	**92**	**2.00**	**.533**	**High**

Table 6.4 shows the following results:

- Mean scores for all items of this domain between nine Jordanian universities are ranging from 1.47 to 2.49 with standard deviations ranging from 0.098 to 0.645, with a degree ranging from high to moderate.
- Jordan University ranks first at this domain with a mean score of 2.49, and a standard deviation of 0.525 with a degree of 'high'. It has the highest mean score among other universities at this domain.

- Jordan University of Science and Technology ranks second among other universities at this domain with a mean score of 2.21, and a standard deviation of 0.469 with a degree of 'high'.
- Al Al-Bayt University ranks third among other universities at his domain with a mean score of 2.10, and a standard deviation of 0.362 with a degree of 'high'.
- While Al-Hussein Bin Talal university ranks as the least university at this domain with a mean score of (1.47), and a standard deviation of (0.337) with degree 'Moderate'.

Testing Proposition 2

Proposition 2 stated that 'Human Resources Information Systems at Jordanian public universities are characterized by high level of specifications and features'. In order to test this proposition, the following calculations were done. To find out if there were any significant differences between the means of responses related to 'HRIS specifications and features' domain according to 'name of university', ONE WAY ANOVA analysis was used. The following Table shows the results of this analysis:

Table 6.5: ONE WAY ANOVA analysis for responses related to HRIS 'Specifications and Features of HRIS' according to 'name of university'

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	5.511	8	.689	2.817	.008*
Within Groups	20.294	83	.245		
Total	**25.805**	**91**			

The Table shows that there are statistical significant differences at α = 0. 05between mean scores of the participants' responses about HRIS specifications at Jordanian public universities related to 'name of university', as F= 2.817 and statistical significance of 0.008 which is less than 0.05 level. To know the sources of these differences, Post Hoc analysis using Sheffee Test is used. The following Table shows the results of this test:

Table 6.6 Sheffee Test Results for the multiple comparisons between Means of the Participants' Responses related to HRIS specifications According to university name

University		1	2	3	4	5	6	7	8	9
	Mean	1.89	1.75	2.10	2.49	2.21	1.47	2.09	1.76	2.04
1. Hashemite	1.89		0.15	0.21	0.60	0.32	0.42	0.19	0.13	0.15
2. Tafilah	1.75			0.35	*0.75	0.47	0.28	0.34	0.01	0.29
3. Al AL-Bayt	2.10				0.39	0.11	0.63	0.01	0.34	0.06
4. Jordan	2.49					0.28	*1.02	0.40	*0.73	0.45
5. JUST	2.21						0.74	0.12	0.45	0.17
6. Al-Hussein	1.47							0.61	0.29	0.57
7. Mutah	2.09								0.33	0.05
8. Al-Balqa	1.76									0.28
9. Yarmouk	2.04									

*. The mean difference is significant at level α = 0.05

The above table shows that there are statistical significant differences at (α = 0.05) between the mean score of Jordan university and the mean scores of Tafila Technical University, Al-Hussein Bin Talal University, and Al-Balqa Applied University in favor of Jordan University as significance value is less than 0.05.

According to the previous calculations on this domain, Proposition 2 stated that 'Human Resources Information Systems at Jordanian public universities are characterized by high level of specifications and features', is accepted.

6.3.2.1 Summary of results related to Question Two

The results of this question focused on describing the current specifications and features of HRIS at HRM departments in the nine Jordanian universities. The findings show that HRIS applied in HR departments at the nine universities are characterized by specifications of a 'high' degree. Some of these features are scaled high such as; an accurate, updated, and comprehensive database for all university staff; a high degree of coordination between HRIS and other MIS at different units and departments of the university; and a high speed to get access to required information at the appropriate time. Other specifications of HRIS are rated moderate in this scale such as: using a fully integrated HR software suite for functional activities; the use of HR Intranets are used to link different HR departments together; the use HR Extranets; the use of Employee self-service (ESS); having the needed information technology of hardware for performing different activities; and documentation and indexing of the related information and technical specifications for HRIS in a user manual that can be referred to by users of HR departments. The least used feature that characterized HRIS is Interactive/Automated Voice Response (IVR or AVR; telephony-based) systems.

When comparing between specifications of HRIS at the nine universities, it was found that the University of Jordan has the highest degree of these features among other universities, followed by Jordan University of Science and Technology. Other universities that have features of HRIS with high degree were Al Al-Bayt University, Mutah University, and

Yarmouk University. The four remaining universities which have HRIS's specifications with moderate degree are Hashemite University, Al-Balqa Applied University, Tafila Technical University, and Al-Hussein Bin Talal University. This last university has the least HRIS specifications among other universities.

It was found also, that there were statistically significant differences between HRIS specifications at Jordanian public universities. The differences were found between Jordan University on one side, and Tafila Technical University, Al-Al-Hussein Bin Talal University, and Al-Balqa Applied University on the other. These differences were in favour of Jordan University.

6.3.3 Results related to Question Three: What is the extent of applying Human Resources Information Systems in HRM functions?

The third main question of this study was designed to investigate the extent of utilization of HRIS applications in five functions of HRM at the Jordanian public universities. To analyze the answers to this question, mean scores and standard deviations for the participants' responses for each item related to 'Applications of HRIS' in five HRM functions (compensation and benefits, performance appraisal, recruitment and selection, training and development, HR planning), are computed as shown in the following table:

Table 6.7 Mean scores and standard deviations for the participants' responses for each item related to 'Applications of HRIS' for HRM functions at Jordanian public universities

Rank	No.	Items	Mean	Std Dev.	Degree
1	3	Compensation and Benefits Administration	2.24	0.56	High
2	1	Recruitment and Selection	1.74	0.88	Moderate
3	4	Performance Appraisal	1.73	0.99	Moderate
4	2	Training and Development	1.62	0.80	Moderate
5	5	Human Resource Planning	1.42	0.87	Moderate
		Total	**1.75**	**0.65**	**Moderate**

The above table shows the following results:

- Mean scores for applications of HRIS for all five HR functions were ranging from 1.42 to 2.24) and standard deviations ranging from 0.56 to 0.99 with a degree ranging from moderate to high.
- 'Compensation and Benefits Administration' function ranks first among HRIS's applications with a mean of 2.24, and a standard deviation of 0.56 with a degree of 'high'. It had the highest mean score among other applications of HRIS for HR functions.
- Applications of HRIS in 'Recruitment and Selection' function ranks secondly with a mean score of 1.74, and a standard deviation of 0.88 with a degree of 'moderate'.
- Applications of HRIS in 'HR Planning' function ranked lastly with a mean score of 1.42, and a standard deviation of 0.87 with a degree of 'moderate '.
- Mean score for the total respondents' responses for the applications of HRIS in the five functions is 1.75 and a standard deviation of 0.65 and a degree of 'moderate'.

6.3.3.1 First: What is the extent of implementing HRIS in 'Recruitment and Selection' function?

To answer this question, the following calculations of mean scores and standard deviations for the responses related to this function, are calculated.

Table 6.8 Mean scores and Standard Deviations for the responses related to 'HRIS applications' domain related to 'Recruitment and Selection' function

Rank	No.	Items	Mean	Std. Dev.	Degree
1	33	HR departments are keeping databases about students who had scholarships from the university and currently studying abroad	2.46	.818	High
2	26	Job vacancies are advertised through the university's website on the internet	2.26	1.088	High
3	28	List of job candidates (e.g., their names, scientific qualifications, experience)can be prepared through HRIS	1.58	1.269	Moderate
4	27	CV's of job candidates are received and then scanned by HRM through using HRIS	1.58	1.242	Moderate
5	32	The advertisements of the university scholarships and receiving the applications of candidates is done through the university websites	1.57	1.189	Moderate
6	29	Written exams for job candidates can be designed, prepared and corrected through using HRIS	1.52	1.245	Moderate
7	31	HRIS help in internal selection process by using staff data bases at the university	1.49	1.134	Moderate
8	30	The data related to job candidates can be exchanged between HRM and the unit which has the vacancy	1.48	1.322	Moderate
		Total	**1.74**	**0.880**	**Moderate**

Table 6.8 shows the following results;

- Mean scores for applications of HRIS for the first HRM functions, which is 'Recruitment and Selection' are ranging from 1.48 to 2.46 and standard deviations ranging from 0.818 to 1.322 with a degree ranging from moderate to high.
- Item no. 33 which provides that "HR departments are keeping databases about students who had scholarships from the university and currently studying abroad" ranks first with a mean score of 2.46, and a standard deviation of 0.81 and it has the highest mean score in this domain.
- Item no. 26 which provides that "Job vacancies are advertised through the university's website on the internet" ranks second with a mean score of 2.26, and a standard deviation of 1.08 with a 'high' degree.
- Item no. 31 which provides that 'The data related to job candidates can be exchanged between HRM and the unit which has the vacancy' ranks last with a mean score of 1.48, and a standard deviation of 1.32 and 'moderate' degree.

Are there any significant differences to the extent of implementing HRIS for 'Recruitment and Selection' function between Jordanian public universities?

To answer this question the following calculations were done:

Table 6.9 Mean scores and std. deviation for responses on 'HRIS applications' related to 'Recruitment and Selection' function according to name of university

Rank	Name of university	N	Mean	Std. Deviation	Degree
1	Tafila Technical University	11	2.82	.065	High
2	Jordan University	9	2.50	.548	High
3	Al Al-Bayt University	8	1.95	.782	Moderate
4	Mutah University	15	1.94	.644	Moderate
5	Yarmouk University	18	1.49	.704	Moderate
6	Jordan University of Science and Technology	8	1.20	.547	Moderate
7	Al-Balqa University	10	1.18	.915	Moderate
8	Hashemite University	8	1.16	.795	Moderate
9	Al-Hussein Bin Talal University	5	.88	.927	Little
	Total	**92**	**1.74**	**.880**	**Moderate**

The above Table shows that 'Tafila Technical University' is ranked as the first university among others to apply HRIS in 'recruitment and selection' function with a mean score of 2.82 and a standard deviation of 0.065 and a 'high' degree. Jordan University is ranked as the second university among others in applying HRIS in different activities of 'recruitment and selection' function with a mean score of 2.50 and a standard deviation of 0.548 and a 'high' degree. The least university among other universities that applies HRIS in 'recruitment and selection' function is Al-Hussein Bin Talal University with a mean score of 0.88 and a standard deviation of 0.927 with a little degree.

Testing Proposition 3.a

Proposition 3.a stated that 'There are no significant differences in implementing HRIS in 'recruitment and selection' function in Jordanian public universities'. In order to test this proposition, the researcher compared the mean scores between and within groups related to 'HRIS applications' domain for 'Recruitment and Selection' function according to 'name of university'. ONE WAY ANOVA analysis is used at a 5% level of significance. The following table illustrates the results of this analysis:

Table 6.10 ONE WAY ANOVA analysis for responses related to HRIS applications for 'Recruitment and Selection' function according to university name

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	32.022	8	4.003	8.640	.000*
Within Groups	38.454	83	.463		
Total	**70.476**	**91**			

*. The mean difference is significant at level α = .05

The above table shows that there are statistically significant differences at $\alpha = 0.05$ between responses about HRIS applications for 'Recruitment and Selection' function at Jordanian public universities related to 'university name' as F= 8.640 and statistical significance = 0.000, which is less than level α = .05. To know the sources of these differences, Post Hoc analysis using Sheffee Test is used. The following table shows the results of this test:

Table 6.11 Sheffee Test Results for the multiple comparisons between the Mean scores of the Participant's Responses related to HRIS applications in 'Recruitment and Selection' function according to the university name

University name	Mean	1	2	3	4	5	6	7	8	9
		1.16	2.82	1.95	2.50	1.20	0.88	1.94	1.18	1.49
1. Hashemite	1.16		1.66*	0.79	*1.34	0.04	0.28	0.78	0.02	0.33
2. Tafilah	2.82			0.87	0.32	*1.62	*1.94	*0.88	*1.64	*1.33
3. Al Al-Bayt	1.95				0.55	0.75	1.07	0.01	0.77	0.46
4. Jordan	2.50					*1.30	*1.62	0.56	*1.32	*1.01
5. JUST	1.20						0.32	0.74	0.02	0.29
6. Hossein	0.88							1.06	0.30	0.61
7. Mutah	1.94								0.76	0.45
8. Al-Balqa	1.18									0.31
9. Yarmouk	1.49									

*. The mean difference is significant at the 0.05 level.

The above table shows the following results related to 'Recruitment and Selection': There are statistically significant differences at α=0.05 between the mean score of Tafila Technical University and scores of Jordan University of Science and Technology, Hussein Bin Talal University, Al-Balqa Applied University, Mutah University, Yarmouk University in favor of Tafila Technical University as sig. less than 0.05.

According to these calculations, Proposition 3a stated that 'There are no significant differences in implementing HRIS in 'recruitment and selection' function in Jordanian universities', is rejected.

6.3.3.2 Second: What is the extent of implementing HRIS in 'Training and Development' function?

To answer this question the following calculations were done:

Table 6.12: Mean scores and std. deviations for responses related to 'HRIS applications' domain of 'Training and Development' function

Rank	No.	Items	Mean	Std. Dev.	Degree
1	39	HR staff is being trained and prepared for using the new HRIS before starting implementation	1.93	.981	Moderate
2	37	Information technology is used in presenting the different training programs	1.84	1.198	Moderate
3	34	HRIS help in specifying the training needs of university staff	1.67	1.060	Moderate
4	35	Computer software is used in designing and preparing the periodic training programs needed for university staff	1.57	1.030	Moderate
5	38	HRIS can help in training university staff through E-learning programs	1.45	1.020	Moderate
6	36	HRIS is used in evaluating the extent to which trainees had benefited from the training programs they attended	1.26	1.004	Moderate
		Total	**1.62**	**0.79**	**Moderate**

Table 6.12 shows that Mean scores for responses related to applications of HRIS for the second HRM functions, which is 'Training and Development' are ranging from 1.26 to 1.93 and standard deviations ranging from 0.981 to 1.198 with a degree 'moderate' at all items. Also, Table 6.12 shows that item 39 provided that "HR staff is being trained and prepared for using the new HRIS before starting of implementation" ranks first with a mean score of 1.93

and a standard deviation of 0.98 because it had the highest mean score in this domain. In addition, item no. 37 provided that "Information technology is used in presenting the different training programs" ranks second with a mean score of 1.84, and a standard deviation of 1.19. While the item no. 36 provided that "HRIS is used in evaluating the extent to which the trainees had benefited from the training programs they attended" ranks last with a mean score of 1.26, and a standard deviation of (1.00) with 'moderate' degree.

Testing Proposition 3b:

Proposition 3b stated that 'There are no significant differences in implementing HRIS in 'training and development' function in Jordanian universities'. In order to test this proposition, a comparison between the nine universities, means and standard deviations are calculated in relation to 'HRIS applications' domain in 'Training and Development' function according to name of university as follows:

Table 6.13: Means and std. deviation for responses related to 'HRIS applications' domain in 'Training and Development' function according to name of university

Rank	Name of university	N	Mean	Std. Dev.	Degree
1	Jordan University	9	2.41	.624	High
2	Tafila Technical University	11	1.89	.135	Moderate
3	Mutah University	15	1.86	.917	Moderate
4	Al Al-Bayt University	8	1.71	.683	Moderate
5	Jordan University of Science and Technology	8	1.65	.737	Moderate
6	Yarmouk University	18	1.54	.690	Moderate
7	Al-Balqa Applied University	10	1.15	.983	Moderate
8	Al-Hussein Bin Talal University	5	1.03	0.237	Moderate
9	Hashemite University	8	.94	.690	Little
	Total	**92**	**1.62**	**.796**	**Moderate**

The above table shows that 'Jordan University' ranks first among other universities in applying HRIS in 'Training and Development' function with a mean score of 2.41 and a standard deviation of 0.624 and a high' degree. Followed, is Tafila Technical University which has the second rank among other universities in using HRIS in different activities of 'Training and Development' function, with a mean score of 1.89 and a standard deviation of 0.135 and a 'moderate' degree. The least university that uses HRIS in this function is found to be 'Hashemite University' . It has a mean score of 0.94 and a standard deviation 0.690 and a 'little' degree.

In order to find out if there are any statistically significant differences between the mean scores of responses related to 'HRIS applications' domain in 'Training and Development' function according to name of university, ONE WAY ANOVA analysis is used. The following table shows the results of this analysis:

Table 6.14: ONE WAY ANOVA analysis for responses related to HRIS applications in 'Training and Development' function according to university name

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	15.086	8	1.886	3.679	.001
Within Groups	42.543	83	.513		
Total	**57.629**	**91**			

*. The mean difference is significant at level $\alpha = 0.05$

Table 6.14 above shows that there are significant differences at $\alpha = 0.05$ between responses about HRIS applications for 'Training and Development' function at Jordanian public universities related to 'university name' as F= 3.679 and statistical significance = 0.001.

To know the sources of these differences, Post Hoc analysis using Sheffee Test for multiple comparisons is used, the following table shows the results of this test:

Table 6.15: Sheffe Test Results for the Differences between the Means of the Participant's Responses related to HRIS applications in 'Training and Development' function According to the university name

University name	Mean	1	2	3	4	5	6	7	8	9
		0.94	1.89	1.71	2.41	1.65	1.03	1.86	1.15	1.54
1. Hashemite	0.94		0.95	0.77	*1.47	0.71	0.09	0.92	0.21	0.60
2. Tafilah	1.89			0.18	0.52	0.24	0.86	0.03	0.74	0.35
3. Al Al-Bayt	1.71				0.70	0.06	0.68	0.15	0.56	0.17
4. Jordan	2.41					0.76	*1.38	0.55	*1.26	0.87
5. JUST	1.65						0.62	0.21	0.50	0.11
6. Hussein	1.03							0.83	0.12	0.51
7. Mutah	1.86								0.71	0.32
8. Al-Balqa	1.15									0.39
9. Yarmouk	1.54									

*. The mean difference is significant at level $\alpha = .05$.

The above table shows that there are statistically significant differences at $\alpha = 0.05$ between mean score of Jordan University, and scores of Hashemite University, Al-Hussein Bin Talal University, and Al-Balqa Applied University in favor of Jordan University as sig. less than 0.05. According to previous calculations, Proposition 3b stated that ' There are no significant differences in implementing HRIS in 'training and development' function in Jordanian universities' is rejected.

6.3.3.3 Third: What is the extent of implementing HRIS in 'Compensation and Benefits Administration' function?

Table 6.16: Mean scores and std. deviation for responses related to 'HRIS applications' domain in "Compensation and Benefits Administration' function

Rank	No.	Items	Mean	Std. Dev.	Degree
1	42	There is a data base of employees' salaries and necessary changes can be made on this data	2.83	.595	High
2	41	HRIS help in preparing periodic reports about salaries of university staff to be used for other purposes (e.g., preparing university's general budget)	2.75	.664	High
3	41	HRIS help in preparing the monthly transcripts of salaries and benefits for the university staff	2.68	.788	High
4	45	HRIS can be used to know the date and degree of expected promotion, the date of renew/terminate the work contract of university staff	2.47	.907	High
5	44	HRIS help university staff to know, directly, information about their health insurance	2.41	1.144	High
6	46	Necessary information about the university's new rules and regulations regarding promotion and retirement is available in HRIS	2.29	1.096	High
7	40	HRIS help in preparing a clear system of salaries and benefits according to data collected from local labour market	2.11	1.074	High
8	47	HRIS help in linking results of performance appraisals' reports with wages and salaries' rates for university staff	1.96	1.166	Moderate
		Total	**2.24**	**0.563**	**High**

Table 6.16 shows that Mean scores for responses related to applications of HRIS for the third HRM functions, which is 'Compensation and Benefits Administration' are ranging from 1.96 to 2.83 and standard deviations ranging from 0.595 to 1.166 with a degree ranging from moderate to high. Also, Table 6.16 shows that item no. 42, which provided that "There is

a data base of employees' salaries and necessary changes can be made on this data", ranks first with a mean score of 2.83 and a standard deviation of 0.59 because it had the highest mean score in this domain. Item no. 41, which provided that "HRIS help in preparing periodic reports about salaries of university staff to be used for other purposes (e.g. preparing university budget)", ranks second with a mean score of 2.75, and a standard deviation of 0.66. While item no. 47, which provided that 'HRIS help in linking results of performance appraisals' reports with wages and salaries' rates for university staff' ranks last with a mean score of 1.96, and a standard deviation of 1.16 with a degree of moderate.

Testing Proposition 3c:

Proposition 3c of the study stated that 'There are no significant differences in implementing HRIS in 'Compensation and Benefits Administration' function in Jordanian universities'. To test this proposition, the following calculations are done. The researcher compared between the nine universities, mean scores and standard deviations are calculated in relation to 'Compensation and Benefits Administration' function according to name of university as follows:

Table 6.17: Means and std. deviation for responses related to 'HRIS applications' domain related to 'Compensation and Benefits Administration' function according to name of university

Rank	Name of university	N	Mean	Std. Dev.	Degree
1	Tafila Technical University	11	2.86	.038	High
2	Jordan University	9	2.58	.313	High
3	Yarmouk University	18	2.38	.387	High
4	Al Al-Bayt University	8	2.25	.641	High
5	Jordan University of Science and Tech.	8	2.17	.530	High
6	Mutah University	15	1.98	.688	Moderate
7	Al-Balqa Applied University	10	1.95	.534	Moderate
8	Hashemite University	8	1.92	0.412	Moderate
9	Al-Hussein Bin Talal University	5	1.73	.369	Moderate
	Total	**92**	**2.24**	**.563**	**High**

The above table shows that 'Tafila Technical University' is ranked as the first university in applying HRIS in 'compensation and benefits administration' function with a mean score of 2.86 and a standard deviation of 0.038 and a 'high' degree. In the second rank is Jordan University, with a mean score of 2.58 and a standard deviation of 0.313 and a 'high' degree. Al-Hussein Bin Talal University is ranked as the last among other universities in implementing HRIS in 'compensation and benefits administration', with a mean score of 1.73 and a standard deviation of 0.369 and a 'moderate' degree.

To find out if there are any significant differences in the level of implementing HRIS for 'Compensation and Benefits Administration' function at Jordanian public universities, the following calculations were done:

Table 6.18: ONE WAY ANOVA analysis for responses related to HRIS applications for 'Compensation and Benefits Administration' function according to university name

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	9.704	8	1.213	5.271	*.000
Within Groups	19.102	83	.230		
Total	**28.806**	**91**			

*. The mean difference is significant at level α = .05.

Table that 6.18 above shows that there are significant differences at α = 0.05 between responses about HRIS applications for 'Compensation and Benefits Administration' function in Jordanian public universities related to 'university name' as F= 5.271 and statistical significance = 0.000. To know the sources of these differences, Sheffee Test for multiple comparisons was used, the following table shows the results of this test:

Table 6.19: Sheffee Test Results for the multiple comparisons between Means of the Participant's Responses related to HRIS applications in 'Compensation and Benefits Administration' function According to university name

University name	Mean	1	2	3	4	5	6	7	8	9
		1.92	2.86	2.25	2.58	2.17	1.73	1.98	1.95	2.38
1. Hashemite	1.92		*0.94	0.33	0.66	0.25	0.20	0.06	0.03	0.46
2. Tafilah	2.86			0.61	0.28	0.69	*1.14	*0.88	*0.91	0.48
3. Al-AlBayt	2.25				0.33	0.08	0.52	0.27	0.30	0.13
4. Jordan	2.58					0.41	*0.85	0.60	0.63	0.20
5. JUST	2.17						0.44	0.19	0.22	0.21
6. Hussein	1.73							0.25	0.23	0.65
7. Mutah	1.98								0.03	0.40
8. Al-Balqa	1.95									0.43
9. Yarmouk	2.38									

*. The mean difference is significant at the .05 level.

The above table shows the following results regarding the applications of HRIS in 'Compensation and Benefits Administration' function:

- There are statistically significant differences at $\alpha = 0.05$ between mean score of Tafila Technical University, and scores of Hashemite University, Al-Hussein Bin Talal University, Mutah University, Al-Balqa Applied University, and in favor of Tafila Technical University as sig. is less than 0.05.
- There are statistically significant differences at $\alpha = 0.05$ between responses of Jordan University and Al-Hussein Bin Talal University in favor of Jordan University as sig. less than 0.05.

According to the previous calculations, Proposition 3c stated that 'There are no significant differences in implementing HRIS in 'Compensation and Benefits Administration' function in Jordanian public universities', is rejected.

6.3.3.4 Forth: What is the extent of implementing HRIS in 'Performance Appraisal' function?

To answer this question, the following mean scores and standard deviations are calculate:

Table 6.20: Mean scores and std. deviations for responses related to 'HRIS applications' domain in 'Performance Appraisal' function

Rank	No.	Items	Mean	Std. Dev.	Degree
1	49	HRIS help in collecting and analyzing the results of current performance appraisal for the university staff	1.92	1.160	Moderate
2	50	HRIS help in collecting and analyzing the results of performance appraisal for the university staff in the past years	1.85	1.157	Moderate
3	52	HRIS provide top management at the university with reports about the results of performance appraisal related to staff	1.82	1.257	Moderate
4	48	HRIS is used in evaluating the individual performance for each of the university staff	1.80	1.216	Moderate
5	51	HRIS help in comparing between levels of employees' performance in different units and colleges of the university	1.72	1.252	Moderate
6	53	HRIS link between the results of the employee's performance appraisal and giving him the appropriate incentive	1.34	1.286	Moderate
		Total	**1.73**	**0.99**	**Moderate**

Table 6.20 above shows that Mean scores responses related to applications of HRIS for 'Performance Appraisal' function, are ranging from 1.34 to 1.92 and standard deviations ranging from 1.157 to 1.286 with 'moderate' degree for all items. Also, Table 6.20 shows that

item no. 49, which provided that "HRIS help in collecting and analyzing the results of current performance appraisal for the university staff", ranks first with a mean score of 1.92 and a standard deviation of 1.16 and 'moderate' degree, and it had the highest mean score in this domain. Item no. 50, which provided that "HRIS help in collecting and analyzing the results of performance appraisal for the university staff in the past years", ranks second with a mean score of 1.85, and a standard deviation of 1.15 and 'moderate' degree. While item no. 53, which provided that "HRIS that link between the results of the employee's performance appraisal and giving him the appropriate incentive", ranks last with a mean score of 1.34, and a standard deviation of 1.28 and 'moderate' degree. To compare between the nine universities, mean scores and standard deviations are calculated in relation to 'Performance Appraisal' in the following table:

Table 6.21: Means and std. deviations for responses related to 'HRIS applications' domain in 'Performance Appraisal' function according to university name

Rank	Name of university	N	Mean	Std. Dev.	Degree
1	Tafila Technical University	11	2.98	.050	High
2	Jordan University	9	2.59	.619	High
3	Al Al-Bayt University	8	1.79	.765	Moderate
4	Mutah University	15	1.63	.843	Moderate
5	Hashemite University	8	1.60	1.109	Moderate
6	Yarmouk University	18	1.56	.754	Moderate
7	Al-Hussein Bin Talal University	5	1.27	1.097	Moderate
8	Al-Balqa Applied University	10	1.00	.892	Moderate
9	Jordan University of Science and Tech.	8	.98	.906	Little
	Total	**92**	**1.73**	**.988**	**Moderate**

The above table shows that 'Tafila Technical University' is the first university in utilizing HRIS in different activities of 'Performance Appraisal' function with a mean score of 2.98

and a standard deviation of 0.050 and a 'high' degree. In the second place, is Jordan University with a mean score of 2.59 and a standard deviation of 0.619 and a 'high' degree. The university that ranks last in implementing HRIS in 'Performance Appraisal' function is Jordan University of Science and Technology with a mean score of 0.98 and a standard deviation of 0.906 and 'little' degree.

Testing Proposition 3d:

This proposition stated that 'There are no significant differences in implementing HRIS in 'Performance Appraisal' function in Jordanian universities'. To test this proposition the following calculations were carried out. To find out if there any significant differences to the extent of implementing HRIS for 'Performance Appraisal' function at Jordanian public universities, the following calculations were done:

Table 6.22: ONE WAY ANOVA analysis for responses related to HRIS applications in 'Performance Appraisal' function according to university name

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	35.707	8	4.463	6.971	*.000
Within Groups	53.146	83	.640		
Total	**88.854**	**91**			

*. The mean difference is significant at level α = .05

Table 6.22 above shows that there are significant differences at α = 0. 05 between responses about HRIS applications for 'Performance Appraisal' function at Jordanian public universities related to 'university name' as F= 6.971 and statistical significance = 0.000. To know the sources of these differences, Post Hoc analysis using Sheffee Test for multiple comparisons is used. The following table shows the results of this test:

Table 6.23: Sheffee Test Results for the multiple comparisons between the Mean scores of the Participant's Responses related to HRIS applications in 'Performance Appraisal' function According to the university name

University name		1	2	3	4	5	6	7	8	9
	Mean	1.60	2.98	1.79	2.59	0.98	1.27	1.63	1.00	1.56
1. Hashemite	1.60		*1.38	0.19	0.99	0.62	0.33	0.03	0.60	0.04
2. Tafilah	2.98			*1.19	0.38	*2.00	*1.71	*1.35	*1.98	*1.42
3. Al-AlBayt	1.79				0.80	0.81	0.52	0.16	0.79	0.23
4. Jordan	2.59					*1.61	1.33	0.96	*1.59	1.03
5. JUST	0.98						0.29	0.65	0.02	0.58
6. Hussein	1.27							0.36	0.27	0.31
7. Mutah	1.63								0.63	0.07
8. Al-Balqa	1.00									0.56
9. Yarmouk	1.56									

*. The mean difference is significant at the .05 level.

The above table shows the following results regarding the applications of HRIS in 'Performance Appraisal' function:

-There are statistically significant differences at $\alpha = 0.05$ between mean score of Tafila Technical University and scores of Hashemite University, Al-AlBayt University, Jordan University of Science and Technology, Al-Hussein Bin Talal University, Mu'ta University, Al-Balqa Applied University, Yarmouk University in favor of Tafila Technical University as sig. is less than 0.05.

There are statistically significant differences at $\alpha=0.05$ between mean score of Jordan University and scores of Jordan University of Science and Technology, and Al-Balqa Applied University in favor of Jordan University as sig. is less than 0.05.

According to previous calculations, Proposition 3d stated that 'There are no significant differences in implementing HRIS in 'Performance Appraisal' function in Jordanian universities', is rejected.

6.3.3.5 Fifth: What is the extent of implementing HRIS in 'Human Resources Planning' function? To answer this question, the following calculations were done:

Table 6.24: Mean scores and std. deviation for responses related to 'HRIS applications' domain in "Human Resources Planning' function

Rank	No.	Items	Mean	St. Dev.	Degree
1	58	HRIS can help to predict future needs of HR (quantitatively and qualitatively) at the university	1.55	1.009	Moderate
2	56	HR plans are reviewed and adjusted periodically according the updated data about university budget	1.52	1.162	Moderate
3	57	HRIS can help in preparing analytical study about cost and efficiency of needed staff of university	1.49	.978	Moderate
4	54	There is a clear HRIS to determine the needs of HR for various departments of the university	1.47	1.244	Moderate
5	55	Information is exchanged between HR departments and other departments and units at the university to participate in HR planning	1.39	1.079	Moderate
6	59	HRIS can help in preparing HR strategic plans for the university	1.36	1.054	Moderate
7	60	HRIS help in analyzing related data from external environment when formulating HR plan at univ.	1.13	1.092	Moderate
		Total	**1.42**	**0.875**	**Moderate**

Table 6.24 shows that mean scores of responses related to applications of HRIS for 'Human Resources Planning' function are ranging from 1.13 to 1.55 and standard deviations ranging from 0.978 to1.244 with 'Moderate' degree for all items. Also, Table 5.24 shows that item no. 58, which provided that "HRIS can help to predict future needs of HR (quantitatively and qualitatively) at the university", ranks first with a mean score of 1.55 and a standard deviation

of 1.00 as it had the highest mean score in this domain. Item no. 56, which provided that "HR plans are reviewed and adjusted periodically according to updated data about university budget", ranks second with a mean score of 1.52, and a standard deviation of 1.16. While item no. 60, which provided that "HRIS help in analyzing related data from external environment when formulating HR plans at the university", ranks last with a mean score of 1.13, and a standard deviation of 1.09.

Testing Proposition 3e:

This proposition states that 'There are no significant differences in implementing HRIS in 'Human Resources Planning' function in Jordanian universities'. To test this proposition, the following calculations were done. To compare between the nine universities, mean scores and std deviations are calculated in relation to HRIS applications in 'Human Resources Planning' function according to name of university as follows:

Table 6.25: Mean scores and std. deviations for responses related to 'HRIS applications' domain in 'Human Resources Planning ' function according to name of university

Rank	Name of university	N	Mean	Std. Dev.	Degree
1	Jordan University	9	2.41	.740	High
2	Tafila Technical University	11	2.29	.000	High
3	Yarmouk University	18	1.45	.661	Moderate
4	Mutah University	15	1.43	.758	Moderate
5	Al Al-Bayt University	8	1.36	.582	Moderate
6	Al-Balqa Applied University	10	.87	.869	Little
7	Jordan Univ. of Science and Technology	8	.84	.750	Little
8	Hashemite University	8	.80	.978	Little
9	Al-Hussein Bin Talal University	5	.63	.480	Little
	Total	**92**	**1.42**	**.875**	**Moderate**

The above table shows that Jordan University is the first among other universities to apply HRIS in 'HR planning' function with a mean score of 2.41 and a standard deviation of 0.740 and a 'high' degree. In the second place is Tafila Technical University with a mean score of 2.29 and a standard deviation of 0.0 and a 'high' degree. Al-Hussein Bin Talal University is ranked as the last among other universities regarding the implementation of HRIS in HR planning with a mean score of .63 and a standard deviation of 0.480 and a 'little' degree.

In order to find out if there were any statistically significant differences between the mean scores of responses related to 'HRIS applications' domain in 'Human Resources Planning' function according to 'name of university', ONE WAY ANOVA analysis was used. The following table shows the results of this analysis:

Table 6.26: ONE WAY ANOVA analysis for responses related to HRIS applications in 'Human Resources Planning' function according to university name

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	29.042	8	3.630	7.426	*.000
Within Groups	40.576	83	.489		
Total	**69.618**	**91**			

*. The mean difference is significant at the .05 level.

Table 6.26 above shows that there are significant differences at α=0.0 5 between responses about HRIS applications for 'Human Resources Planning' function at Jordanian public universities related to 'university name' as F=7.426 and statistical significance =0.000. To know the sources of these differences, Post Hoc analysis using Sheffee Test was used. The following table shows the results of this test:

Table 6.27 Sheffee Test Results for the multiple comparisons between the mean scores of the participant's responses related to HRIS applications in 'Human Resources Planning' function according to the university name

University name		1	2	3	4	5	6	7	8	9
	Mean	0.80	2.29	1.36	2.41	0.84	0.63	1.43	0.87	1.45
1. Hashemite	0.80		*1.49	0.56	*1.61	0.04	0.17	0.63	0.07	0.65
2. Tafilah	2.29			0.93	0.13	*1.45	*1.66	0.86	*1.42	0.84
3. Al-AlBayt	1.36				1.05	0.52	0.73	0.07	0.49	0.09
4. Jordan	2.41					*1.57	*1.78	*0.98	*1.54	*0.96
5. JUST	0.84						0.21	0.59	0.03	0.61
6. Hussein	0.63							0.80	0.24	0.82
7. Mutah	1.43								0.56	0.02
8. Al-Balqa	0.87									0.58
9. Yarmouk	1.45									

*. The mean difference is significant at the .05 level.

The analysis of the above statistics shows that:

- There are statistically significant differences at α=0.05 between mean score of Hashemite University and scores of Tafila Technical University, Jordan University of Science and Technology, Al-Hussein Bin Talal University, Al-Balqa Applied University in favor of Tafila Technical University as sig. is less than 0.05.
- There are statistically significant differences at α=0.05 between mean score of Jordan University and scores of Hashemite University, Al-Hussein Bin Talal University, Mutah University, Al-Balqa Applied University, and Yarmouk University in favor of Jordan University as sig. is less than 0.05.

According to previous calculations, Proposition 3e, which stated that 'There are no significant differences in implementing HRIS in 'Human Resources Planning' function in Jordanian universities', is rejected.

6.3.3.6 Summary of results related to Question Three

The results of this question show that there are different areas to which HRIS are applied for the automation of various HRM activities. Compensation and benefits administration is the most commonly used of HRIS's applications among the five main human resource management functions adopted in this study. The results show that the rate of HRIS's applications in this function's activities is high, while for the other HRM functions, accordingly, which are Recruitment and Selection, Performance Appraisal, Training and Development, and Human Resource Planning, the rate is moderate. The last function is having the lowest rate among other functions that is utilizing HRIS in its various activities.

For ***'Selection and Recruitment function'*** the results show that the activities related to this function and utilizing HRIS applications with a moderate degree are; keeping data base about students who have scholarships from the university, job vacancies are advertised through the university's website on the internet, the advertisements of the university scholarships and receiving the applications of candidates is done through the university websites, the data related to job candidates can be exchanged between HRM department and the unit which has the vacancy, and preparing the list of job candidates through HRIS. The activities that are utilized through HRIS applications and related to 'Selection and Recruitment' function and rating moderate degree are; receiving and scanning CV's of job candidates, designing, preparing and marking written assessments for job candidates, and using data base of university's staff in internal selection process for openings and vacancies. The last activity is having the least rate among other activities.

When comparing between the nine universities regarding the utilization of HRIS in the activities of 'Selection and Recruitment', the results show that Tafila Technical University

had the highest rate of utilization, followed by Jordan university. Other universities such as Al Al-Bayt University, Mutah University, Yarmouk University, Jordan University of Science and Technology, Al-Balqa University, and Hashemite University had a 'moderate' level of utilization. The least university that was using HRIS applications in 'Selection and Recruitment' with 'little' degree, was Al-Hussein Bin Talal University.

The results show also that there are statistically significant differences between responses about HRIS applications for 'Recruitment and Selection' function at Jordanian public universities. The differences are between Tafila Technical University from one part, and Jordan University of Scienceand Technology, Hussein Bin Talal University, Al-Balqa Applied University, Mutah University, and Yarmouk University from the other part, in favour of Tafila Technical University. Also, there are statistically significant differences between Jordan University from one part and Hashemite University, Jordan University of Scienceand Technology, Al-Hussein Bin Talal University, Al-Balqa Applied University, and Yarmouk University. The differences were in favour of Jordan University.

Regarding the second function of HRM that applies HRIS in its different activities ***'Training and Development' function***, the results show that there is moderate degree of use for this function for all the items that were included in the questionnaire. Some of the activities that HRIS help in performing, and were included in the questionnaire are; training HR staff for using the new HRIS, using information technology and computer software in presenting different training programs, specifying training needs of university's staff etc.

When comparing between the nine universities regarding the application of HRIS in 'Training and Development' function, the findings revealed that Jordan University was the first ranked university to use these applications and has the highest degree of use. Other universities are using HRIS applications in this function with a 'moderate' degree. These universities' names are; Tafila Technical University, Mutah University, Al Al-Bayt University, Jordan University of Scienceand Technology, Yarmouk University, Al-Balqa Applied University, and Al-Hussein Bin Talal University. The least university that utilizes HRIS applications in this function is Hashemite University with a 'little' degree of use.

The findings revealed also that there are statistically significant differences between HRIS applications for 'Training and Development' function between Jordanian public universities. The differences are between Jordan University on the one hand, and Hashemite University, Al-Hussein Bin Talal University, and Al-Balqa Applied University on the other. The differences were in favour of Jordan University.

The third HRM function that implement HRIS in its various activities was ***'Compensation and Benefits Administration'***. The findings of the study show that the various activities of this function are performed through HRIS applications with the highest degree among other HRM functions. Among the activities that were related to this function and were performed with a high degree, through implementing HRIS were; existing of database of employees' salaries, availability of necessary data about health insurance, date and expected date of promotion renew/terminate of the work contract, etc. The only activity among other activities that was rated moderate was that HRIS help in linking results of performance appraisals' reports with wages and salaries' rates for university staff.

When comparing between universities regarding the application of HRIS in compensation and benefits administration, the results of this study revealed that there are five universities that used HRIS applications with a high degree. These universities are Tafila Technical University, Jordan University, Yarmouk University, Al Al-Bayt University, Jordan University of Science and Technology. Among these universities, Tafila Technical University was ranked as the first university to apply HRIS in compensation and benefits administration with the highest degree of implementation. The other four universities applied HRIS in the activities of compensation and benefits administration to a moderate degree. These universities are Mutah University, Al-Balqa Applied University, Hashemite University, and Al-Hussein Bin Talal University. The university that had the lowest degree of implementing HRIS in this function is Al-Hussein Bin Talal University.

The findings show that there are statistically significant differences among the nine Jordanian universities regarding the application of HRIS in compensation and benefits activities. These differences were among Tafila Technical University on the one side, and Mutah University, Al-Balqa Applied University from the other. The differences were in favour of Tafila Technical University. Also, there were statistical differences between Jordan University and Al-Hussein Bin Talal University in favour of Jordan University.

Regarding the fourth function of HRM that applies HRIS in performing its various activities ***'Performance Appraisal'***, the findings show that there is a moderate degree of HRIS use among all activities stated in the questionnaire. The highest degree of HRIS application is for the activity of collecting and analyzing the results of current performance appraisal for the university staff. The lowest degree of HRIS application was in the activity of linking

between the results of employees' performance appraisal and giving them the appropriate incentive.

When comparing between the nine universities, the findings show that Tafila Technical University, and Jordan University are using HRIS applications in performance appraisal activities with a high degree, while six universities are using HRIS applications with a moderate degree. These universities are; Al Al-Bayt University, Mutah University, Hashemite University, Yarmouk University, Al-Hussein Bin Talal University, and Al-Balqa Applied University. The university that applied HRIS in performance appraisal with a little degree was Jordan University of Science and Technology.

The findings also show that there were statistically significant differences between the nine universities in relation to HRIS applications in performance appraisal function. These differences were between Tafila Technical University on the one hand, and Hashemite University, Al-AlBayt University Jordan University of Scienceand Technology University, Al-Hussein Bin Talal University, Mu'ta University, Al-Balqa Applied University, and Yarmouk University on the other. These differences were in favour of Tafila Technical University. Also, there were differences between Jordan University on the one side, and Jordan University of Scienceand Technology, and Al-Balqa Applied university on the other. The differences were in favour of Jordan University.

Regarding the fifth and last function of HRM ***'Human Resource Planning'*** and the application of HRIS in its diverse activities, the results show that there is a moderate degree of HRIS implementation in all activities stated in the questionnaire. The highest degree of

HRIS implementation was for predicting future needs of HR (quantitatively and qualitatively) at the university. The lowest degree of HRIS implementation was that HRIS help in analyzing related data from external environment when formulating HR plan at the university.

When comparing between the nine universities regarding the application of HRIS in the activities of this function, the results show that the degree of application for Jordan University, and Tafila Technical University was high. Jordan University was ranked first. For Yarmouk University, Mutah University, and Al Al-Bayt university, the degree of application was moderate. The four remaining universities applied HRIS in HR planning with little degree. These universities are Al-Balqa Applied University, Jordan University of Science and Technology, Hashemite University, and Al-Hussein Bin Talal University. The last university had the lowest degree of applying HRIS in this HRM function.

It was also found from the findings of the study that there were statistically differences between the nine universities regarding the application of HRIS in the function of HR planning. The differences were between Tafila Technical University and each of; Hashemite University, Jordan University of Science and Technology, Al-Hussein Bin Talal University, and Al-Balqa Applied University. The differences were in favour of Tafila Technical University. In addition, there were statistically significant differences between Jordan University and each of Hashemite University, Jordan University of Science and Technology, Al-Hussein Bin Talal University, Mutah University, Al-Balqa Applied University, and Yarmouk University. The differences were in favour of Jordan University.

6.3.4 Results related to Question Four:

What are the obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities?

The fourth main question of this study is related to potential barriers to the implementation of HRIS in Jordanian public universities. To analyze the answers to this question, mean scores and standard deviations for the participants' responses for each item related to 'Obstacles facing the implementation of Human Resources Information Systems in Jordanian public universities', are computed as shown in the following table:

Table 6.28 Mean scores and standard deviations for the participants' responses for each item related to "Obstacles facing the implementation of Human Resources Information Systems at Jordanian Public Universities'

Rank	No.	Items	Mean	Std. Dev.	Degree
1	61	Lack of support by top management of university	1.88	1.137	Moderate
2	63	Lack of HR staff knowledge, skills and training	1.79	1.085	Moderate
3	64	Insufficient financial support for HRIS by the university	1.73	1.120	Moderate
4	66	Lack of commitment and involvement of HR employees in developing HRIS at their departments	1.68	1.109	Moderate
5	65	Poor communication between HR staff and the responsible department of HRIS (e.g. Computer Centre)	1.60	1.071	Moderate
6	62	Satisfaction of HR managers with the status quo (Fear to change the way HR staff and managers do things)	1.59	1.159	Moderate
7	67	The inflexibility and difficulty of implementing the HRIS by HR staff	1.58	1.131	Moderate
8	69	There are no suitable software packages available to HR department in applying HRIS	1.52	1.064	Moderate
9	68	Lack of perception of HR employees about the advantages of applying new HRIS in performing their jobs	1.41	1.091	Moderate
		Total	**1.64**	**0.83**	**Moderate**

The above table shows the mean ratings and the ranking of the potential barriers to the implementation of HRIS. The main findings can be summarized as follows:

- Mean scores for all items of this domain are ranging from 1.41 to 1.88 with standard deviations ranging from 1.064 to1.59, with a degree of 'Moderate'.
- The largest barrier to the adoption of HRIS is "Lack of support by top management of university" (item no. 61). It is ranked as the first barrier with a mean score of 1.88, and a standard deviation of 1.137 with a degree of 'Moderate'. It had the highest mean score among items of this domain.
- Item no. 63, which provided that "Lack of HR staff knowledge, skills and training", ranks as the second barrier with a mean score of 1.79, and a standard deviation of 1.085 with a degree 'Moderate'
- The item no. 68, which provided that "Lack of perception of HR employees about the advantages of applying new IS in performing their jobs", ranks as the item with the least mean score of 1.41, and a standard deviation of 1.091 with a degree of 'Moderate'.

Testing Proposition 4:

This proposition stated that 'There are no obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities'. To test this proposition, the following calculations are done (see Table 6.29). To compare between the nine universities regarding the obstacles facing the implementation of HRIS, mean scores and std deviations are calculated according to name of university as follows:

Table 6.29: Mean scores and standard deviations for the participants' responses for "Obstacles facing the implementation of HRIS between Jordanian Universities

Rank	Name of university	No. of respondents	Mean	Std. Dev.	Degree
1	Tafila Technical University	11	2.74	0.075	High
2	Hashemite University	8	2.11	0.168	High
3	Mutah University	15	1.73	0.832	Moderate
4	Al-Hussein Bin Talal univ.	5	1.58	0.904	Moderate
5	Yarmouk University	18	1.52	0.525	Moderate
6	Al-Balqa Applied University	10	1.37	1.038	Moderate
7	Jordan Univ. of Science and Technology	8	1.28	0.961	Moderate
8	Al-AlBayt University	8	1.22	0.675	Moderate
9	Jordan University	9	1.01	0.654	Moderate
	Total	**92**	**1.64**	**0.831**	**Moderate**

In order to find out if there are any statistically significant differences between the mean scores of responses related to 'Obstacles facing the implementation of Human Resources Information Systems at Jordanian Public Universities', ONE WAY ANOVA analysis is used. The following table shows the results of this analysis:

Table 6.30: ONE WAY ANOVA analysis for responses on related to "Obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities' due to 'university name'

	Sum of squares	Df	Mean Square	F	Sig.
Between Groups	22.176	8	2.772	5.654	0.000
Within groups	40.691	83	0.490		
Total	**62.867**	**91**			

It is found from the above table that there are significant differences at α = 0. 05 between responses about "Obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities' due to 'university name' as F= 6.654 and statistical significance = 0.000. To know the sources of these differences, Post Hoc analysis using Sheffee Test for multiple comparisons was used, the following table shows the results of this test:

Table 6.31: Sheffee Test results for multiple comparisons of mean scores of responses regarding "Obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities"

University name	Mean	1	2	3	4	5	6	7	8	9
		2.11	2.74	1.22	1.01	1.28	1.58	1.73	1.37	1.52
1. Hashemite	2.11		0.63	0.89	*1.10	0.83	0.53	0.38	0.74	0.59
2. Tafilah	2.74			*1.52	*1.73	*1.46	1.16	*1.01	*1.37	*1.22
3. Al Al-Bayt	1.22				0.21	0.06	0.36	0.51	0.15	0.30
4. Jordan	1.01					0.27	0.57	0.72	0.36	0.51
5. JUST	1.28						0.30	0.45	0.09	0.24
6. Hussein	1.58							0.15	0.21	0.06
7. Mutah	1.73								0.36	0.21
8. Al-Balqa	1.37									0.15
9. Yarmouk	1.52									

*. The mean difference is significant at the .05 level.

The above table shows the following results:

- There are statistically significant differences at α=0.05 between mean score of Hashemite University and score of Jordan University in favor of Hashemite University as sig. is less than 0.05 (= .044)

- There are statistically significant differences at α=0.05 between mean score of Tafila Technical University and scores of Al-AlBayt University, Jordan University, Jordan University of Scienceand Technology, Mutah University, Al-Balqa Applied University, and Yarmouk University in favor of Tafila Technical University as sig. is less than 0.05.

According to the above calculations, Proposition 4 stated that 'There are no obstacles facing the implementation of Human Resources Information Systems at the Jordanian public universities', is rejected.

6.3.4.1 Summary of results related to Question Four

The findings of the study illustrate that the potential barriers of implementing HRIS in Jordanian universities as perceived by the respondents of this study, are of moderate degree in general. The lack of support and commitment from top managers was the most frequently cited barrier to HRIS implementation in Jordanian public universities with a degree of moderate. In the second rank, the barrier was 'Lack of HR staff knowledge, skills and training'. The least barrier of HRIS implementation was 'Lack of perception of HR about the advantages of applying new HRIS in performing their jobs'.

When comparing between the nine universities regarding the obstacles of implementing HRIS at their HRM departments, the findings demonstrated that Tafila Technical University is the university that has the obstacles with the highest degree, and it is followed by Hashemite University with a high degree also. The remaining universities, which are seven, were perceived to have barriers of HRIS application with a moderate degree. These universities are; Mutah University, Al-Hussein Bin Talal University, Yarmouk University,

Al-Balqa Applied University, Jordan University of Science and Technology, Al-AlBayt University, and Jordan University.

The results reveal that there are statistically significant differences between the mean scores of responses related to 'Obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities'. These differences are among Tafila Technical University with Al-AlBayt University, Jordan University, Jordan University of Science and Technology, Mutah University, Al-Balqa Applied University, and Yarmouk University. These differences were in favour of Tafila Technical University. In addition, there are statistically significant differences between mean scores of Hashemite University and Jordan University in favour of Hashemite University.

6.4 Conclusion

The main results that have emerged from this study, and that will be discussed in the following chapter, are:

- Computer centre at each university is individually responsible for operating, maintaining and setting standards of HR information technologies at HRM departments at each university.
- Computer centre and HR department at each university are mainly involved in planning stages of HRIS. Also, they are involved jointly in designing and developing the new HR information technologies at HRM departments at each university. Computer centre at each university seem to play a prominent role in most HRIS's development activities, which are planning, designing, developing, operating and maintaining activities. The responsibility

for implementing these systems, entering, editing, updating, saving, processing and retrieving data lie almost entirely with HR staff.

- Planning process for HR information technologies does not occur periodically, instead it occurs with no specific period of time and depends on the urgent need for any new information technologies.
- The overall utilization of HRIS at Jordanian public universities is concentrated on the more routine functions of employee information and compensation management. The more sophisticated uses of HRIS such as employee development and strategic planning are still not effective. Of the five main HRM functions adopted in this study, compensation administration is the most commonly used, followed by recruitment and selection, and performance appraisal, training and career development. Human resource planning capabilities are less frequently utilized.
- The potential barriers of applying HRIS at the nine Jordanian public universities were perceived by the respondents, to be of moderate degree. The lack of support and commitment from top managers was the most frequently cited barrier to HRIS implementation at Jordanian public universities. The least barrier was 'Lack of perception of HR staff about the advantages of applying HRIS.

The next chapter will discuss and evaluate the above main findings in relation to the main study questions presented in chapter one. Also, these findings will be discussed in relation to the literature reviewed earlier and in relation to the socio-economic context of Jordan.

CHAPTER SEVEN

DISCUSSION

7.1. Introduction

This chapter provides a detailed discussion of the study findings obtained from the data collected through the use of questionnaires. The findings are classified according to the specific issues in relation to the research questions put forward in chapter one. The issues that pertain to each question are discussed in relation to the literature reviewed in earlier chapters and to the socio-economic and cultural context of the Kingdom of Jordan. The discussion will also point to the contribution that this study has made to knowledge in theory and practice.

7.2 Question one: What is the current status of Human Resources Information Systems (HRIS) (management, planning, operating, and maintaining) at Jordanian public universities?

The main issues that have emerged from the results showed in the previous chapter regarding the current status of HRIS in Jordanian public universities can be clustered as follows:

7.2.1.The Computer Centre plays a central role in Jordanian public universities

The computer centre (it is known in some Jordanian universities as computer and information centre) has been one of the most important units at each Jordanian university. The important role of this unit/department is in providing a high quality e-working environment that maximizes performance, promotes academic excellence, enhances productivity, and improves the quality of research. Each Jordanian university is working hard, through its computer centre, to automate the academic and administrative services it provides for the students,

academics and administrators. Each university pursues such efforts in order to arrive at 'Electronic management' stage. Arriving to this stage is expected to save the university a great amount of money, time, and effort, and therefore develop its scientific and administrative processes. The Computer Center at each university provides it with a rapidly expanding ICT infrastructure to accommodate its growing administrative and academic needs. The University computing facilities comprise of large number of personal computers, server, Gigabit and wireless Ethernet networks that span the entire campus, and an Internet connection. Also each computer centre manages the Network security through Firewall and Corporate Anti-virus system.

As well as providing for the university's staff and students, the computer centre plays a major role in providing different individuals from the local community, with various IT courses. For example, till 2008, there were 10828 person from the local community who had ICDL training, 8232 out of them took the license, and 87482 times ICDL exam were held at the computer centre at Yarmouk University (www.yu.edu.jo). Different trainers from different institutions such as the Ministry of Education, local communities and private universities benefited from such IT courses. Since its foundation in 1979, the computer centre at Yarmouk University has achieved tangible and distinguished achievements in providing the infrastructure for a network that has served the students, and the academic and administrative staff as well as many members of the local community.

In addition to serving the local community, computer centre at each Jordanian university plays a major role in providing services to regional and international beneficiaries. For example, the computer centre at Yarmouk University developed various information systems

and offered the technical support and consultancies for different Arab countries, such as developing the Registration System at Al-Dhafar University in Oman, and the academic information systems for Delmon University in Bahrain.

Furthermore, managements at public universities are working on transforming computer centers into standard "best practice" data centers and preparing plans to make available state-of-the-art data centers equipped with high-available, scalable, manageable and cost-effective infrastructure and network devices that can securely and reliably support different online services inter- and intra-universities. For example, recent reports from the Ministry of Planning and International Cooperation in Jordan indicates that the computerizing of teaching and management processes at Jordanian universities had increased from 50% in 2006 to 80% in 2008 (MOPIC, 2009).

In each Jordanian university studied, the computer centre plays an impressive and dominant role in planning, designing, implementing, and maintaining HRIS. One possible reason for explaining the control of HRIS by computer centre at each Jordanian university is that computer science requires technical knowledge and expertise in information systems and technology. As professionals of information systems and technologies, the staff of computer centre at each university has the needed experience and specialized skills in the fields of IS and IT more than any other staff at the university. While networks and databases that contain all needed information and data of university staff is located at the computer centre at each university, the computer centre is considered to act as information system department at other organizations.

The important role of information systems department (represented by the computer centre at universities) in planning, designing, implementing, and maintaining HRIS is supported by DeSanctis (1986) study which stated that although HRIS has established independence from other MIS in the organization, it has not yet matured to be an independent entity within the personnel area in a large number of firms. He stated that HRIS as a subunit reported to HR or related areas no longer to the IS function. In contrast, Lin (1997) stated that human resource department, not Information System (IS) department, plays a major role in designing HRIS in the majority of the responding companies of her study. Hoffmann and Hoffmann (1998) stated that HRIS was responsible for most of IT in HR; information system department only supported hardware systems to a larger extent. Agreed with Lin, are the findings of Kinnie and Arthurs' (1996) study which found that personnel specialists claim to be highly involved in all stages of the design, implementation and management of the HRIS projects.

Moreover, this study has found that in the stages of planning, implementing and developing HRIS, the participation of HR staff was very important. Cholak and Simon (1991) reported that 63% of respondents believed that their computer needs are more satisfactorily met when the HR department controls the HRIS not IS department. However, in the maintenance stage, this study has found that the computer centre has increasing control because the ongoing modification of the system or maintaining an effective HRIS requires more technical knowledge than typical HR staff has. Similarly, Cholak and Simons (1991) mentioned that an HRIS still requires the great participation of IS department, particularly in the planning and developmental stages. Moreover, Sulaiman et al (1998) stated that the involvement of HR staff are said to be important during HRIS planning and implementation stages, while IS

department is only responsible for maintaining HRIS, while the responsibility for data entry, accuracy, editing, and updating lie almost entirely with HR departments.

In the planning stage of HRIS, it was found in this study that the computer centre plays a major role. A plan for HRIS is important to identify significant IT related problems, propose solutions for the problems, identify budget recourses and staffing, and include an evaluation component. Significant problems vary from one Jordanian university to another, but certain elements occur on every university, such as hardware and software upgrades. To formulate reasonable HRIS plans, HR managers and staff specify their needs from HRIS and inform the computer centre's technicians with such needs. While HR staff and computer specialists often speak quite different languages, careful consideration of the needs of the two cultures can improve communication and results.

Moreover, this study found that there are no regular plans for HRIS at Jordanian universities, and planning is only made when needed for specific activities. This finding is supported by Barratt's (2001) study which found that there is a lack of overall HRIS planning at university campuses. The participation of HR staff into planning process of HRIS, as approved by this study, is important as it can add richness and reality to these plans, and improves services rendered to overall university's staff. Mobaideen (2006) concluded that the decision makers at Jordanian universities have unstable mood and accordingly there is no clear vision or written plans or strategies for the implementation of HRIS systems.

One possible explanation for this lack of regular plans in Jordanian universities is that most likely caused by the emergent nature of IT into HRM functions and the consequent lack of

knowledge and resources at each university. Other possible explanation is the routine system and centrality that dominate most of universities' activities and work. The consequence of the lack of planning results in a lack of services to university's staff, lack of resources, lack of coordination, and lack of developmental opportunities for HR staff.

7.2.2.The implementation of HRIS reflects the performance of information technology industry in Jordan

Jordan is rapidly expanding in some fields such as education, computerization, e-government, in addition to a rapid spread of knowledge centers in remote areas, and the establishment of a legal environment sustaining this progress. Presently, information technology is considered to be one of the main drivers of sustainable economic and social development for Jordan. Its significance lies in the fact that it is a tool used by economies to enhance productivity, as well as increase value added by creating a knowledge-based economy and improving educational activities. Hence, currently IT is one of the top priorities on the Jordanian government's agenda, aiming to improve, develop and enhance its information technology cluster and its use in higher education institutions.

Furthermore, according to the World Economic Forum, in 2006, Jordan's Network Readiness Index (NRI) ranking dropped from 47 to 57 among 104 nations (ESCWA, 2007). This index is used to measure the degree of preparation of a nation or community to participate in and benefit from IT developments. Moreover, The NRI examines the readiness of economies according to the general macroeconomic and regulatory environment for Information and Communication Technology (ICT), the readiness of individuals, businesses and governments to use and benefit from ICT, and their current usage (Al-Zoubi et al, 2007).

Moreover, the Digital Access Index (DAI) that measures the overall ability of individuals in a country to access and use new ICTs. The DAI is built around four fundamental factors that impact a country's ability to access ICTs which are; infrastructure, affordability, knowledge and quality and actual usage of ICTs. The DAI allows countries to compare to peers and outline their relative strengths and weaknesses. The DAI also provides a transparent and globally measurable way of tracking progress towards improving access to ICTs. The DAI has been calculated for 181 economies where Jordan was ranked 78 with a medium score of 0.45 (Al-Zoubi et al, 2007).

A large part of Jordan's labour force is educated and bilingual, speaking Arabic and English. This means that Jordan has a potential competitive advantage in the IT sector, both to cater to the Arabic speaking market in the region, and the English-speaking North American, European, and Asian markets. According to Jordan Competitiveness Report (2007) the main constraints in the industry of IT in Jordan are; human resources with inadequate education and poor work ethics, and instability and inefficiency of government's policies.

The Jordanian government realizes the importance of education in developing the IT sector and forced drastic reforms to introduce computer-based education in public and private schools. Public and Private educational and training institutions specializing in IT-core and IT-related fields are considered to be national development flagship centers.

The Jordanian IT sector has witnessed fast changes after being identified as a key catalyst for economic growth by His Majesty, King Abdullah II in 1999. Total revenues from the sector

have surged from a little over USD $170 million in 2001 to over USD $750 million in 2006 – a more than four-fold increase. Export revenue also quadrupled - rising from USD $40 million to USD $191 million in the same period. At present, the IT sector contributes about 5% of GDP. Moreover, the number of employees in the IT sector has increased from a little over 6,000 to over 10,000 in this same period (Dahlman, 2007). This reflects the fact that Jordanian IT firms are building capacity, and are competing locally, regionally, and in several cases globally through establishing Joint-Venture projects with IT multinationals.

Jordan's IT Sector is a dynamic value-added aspect of the economy that plays an important role in driving other key economic sectors. It has emerged as a strong economic player since 1995. The IT Sector is responsible for the direct growth in value-added economic outputs which have considerable effect on the growth of the national economy, such as education, public administration, business service entities and manufacturing industries.

7.3 Question two: What are the specifications and features of Human Resources Information Systems at HR departments at Jordanian public universities?

The findings of this study regarding the specifications and features of HRIS at Jordanian universities, have revealed the following issues:

7.3.1 Development of Higher Education Information Systems at the national level in Jordan

For the proper utilization of information as a national resource necessary for the development process, Jordan has embarked on establishing a National Information System (NIS). After approving a strategy for developing human resources by the Jordanian Council of Ministers

in 1998, accordingly, National Centre for Human Resources Development (NCHRD) established the project of National Information System (NIS). NIS project aimed to develop and process information ensuring its flow to users in the public and private sectors, so as to enhance the management and organizational effectiveness, thus promoting socio-economic development. The NIS is a totally decentralized information system involving all public and private institutions producing or gathering information. Information is divided into 17 groups to facilitate use; Industry; Education and training; Geography; Political affairs; Research, Science and Technology; Law and Legislation; Natural resources; Agriculture; Environment; Economics and Finance; Culture; Population and Humans Settlements; Health; Labor; Society and Social Conditions; Transportation; and Tourism and Antiquities.

The NIS relies on the Internet for the supply and exchange of accurate, global, modern and available information to all without exception. It is utilized for decision-making, planning and research at the institutional and national levels in both the public and private sectors. This is accomplished through a network of computerized information systems, thus facilitating the availability of unified timely information to the various sectors of the community. A sub-system of the NIS is for human resources, which is known as Higher Education Information System (HEIS). The HEIS aims to support and develop the Jordanian human resources and to enhance reliance on updated information and detailed data, and to use them for purposes of planning, drawing policies, and decision making on personal and institutional levels. Other aims of HEIS are; providing periodic and continuous indicators and related characteristics of HR in Jordan, providing data and information for researchers, policy and decision makers, establishing international comparisons that concentrate on weakness and strength points in

relation to local labor market trends. In addition, using information collected in employment and training databases helps in identifying skills and training gaps and incorporating them into e-learning, e-government, and higher education planning.

The HEIS project aims to provide three main services, which are:

1) Electronic Labour Exchange: to establish databases of HR that includes the main structures of population and labor force data, and labor market and education indicators. Examples of these HEIS data include numbers of enrolled students, graduates, and academic and administrative staff at Jordanian universities. The data, along with other statistics, have been processed into information used to be presented in the form of indicators, studies, research projects and forecasts.
2) Human Resources Information: to provide updated information that is accessible electronically for both parties of supply and demand in Jordanian labor market (services of electronic employment for job seekers and employers).
3) Career Counselling: to provide vocational guidance to help individuals to identify their abilities, aptitudes, skills, and readiness to work in light of their qualifications and experiences, jobs that suite them, work requirements, and characteristics of labor force. It also provides other tools related to career counseling.

The HEIS is available on the internet with the two languages Arabic and English, and used the standard Jordanian classification for professions, and the standard Jordanian classification for education. These classifications are compatible with the international classifications.

The Higher Education Indicators (HEI) report is among the outputs of HEIS. This HEI report acts as a reference point for the policy-making process in higher education sector, to establish national benchmarks comparable with international indicators and to search for the institutional set up that will guarantee that the work will continue in the future.

HRIS databases found at Jordanian universities consist partly of the Higher Education Information System (HEIS) which was built and developed by the National Centre for Human Resources Development (NCHRD) in Jordan. The availability of HRIS database is the highest rated feature among specifications of HRIS at the universities surveyed. It consists of a group of organized integrated files that contain groups of records where all related data of university's staff are stored in. These databases are very important for planning, organizing, and decision-making processes that are undertaken at different units of these universities.

HRIS's databases used at Jordanian universities include various classifications of data; job history (transfers, promotions, etc.), current and historical pay details, inventories of skills and competencies, education and training records, performance assessment details and results, absence, lateness, accident, medical and disciplinary records, warning and suspensions, holiday entitlements, pension's data and termination records, productivity evaluation, turnover rates, salaries, university budget, vacancies, employment, etc... Moreover, HRIS databases in Jordanian universities are used to generate different types of reports such as human resource plans, job evaluation data, payroll, performance records, turnover data, applicant database, benefits utilization, employee histories, health and safety

reports, job descriptions and specifications, job postings, pension plan information, and skills inventories.

The availability of a comprehensive database at Jordanian public universities is supported by Al-Jarrah and Yaseen (2007) study which stated that Human Resource Departments at all of Jordanian public universities used a comprehensive database. Also, Tansley et al, (2001) study confirmed that HRIS provides an electronic database for the storage and retrieval of HR data that is at least potentially available to anyone who may want to access it. They added that reports can be generated from data input into an HRIS database through previously programmed report generators. Similarly, Kinnie and Arthurs (1996) concluded that the existence of a central employee database could maintain the power of the personnel function since it may gather employee information that was previously highly fragmented. They added that personnel would occupy a particularly strong position when they have control over the input of staff data, and their ability to produce reports from the employee database can become a source of power for them. Also, Teo et al (2001) stated that HRIS functions as a database that maintains employee records had been used for HRM activities in the firms surveyed.

7.3.2 Use of networks at Jordanian universities

Using Extranet technologies generally helps to reduce cost and time of communication between university's staff, and with other external parties outside the university. HR Extranets enables direct contact between university's HR departments and external entities

and service providers in Jordan, such as pension providers, health benefit administrators, and libraries at other public Jordanian universities, etc.

Intranets at HTTP-based communications are constrained within the university network. According to the results of this study, Intranets are used more than Extranets. Intranets enable HR department at each university to publish any important information that relates to the university's staff such as work-related documents, policies, handbooks, access to job postings, circulars, new announcements, range of services available from HR staff, online oversight of health benefits, pensions, etc. The intranet at each university links different departments and colleges inside the university with each other, and links them with the computer centre at the university. Through using this network every end user (employee) can get access to the information he/she needs. Each public university in Jordan is interconnected using a gigabit network. A National Broadband Network was launched in 2003 to link together Jordan's public schools, public institutions of higher education, and Knowledge Stations.

This study has found that Jordanian universities use extranet, intranet, and Internet at their campuses. The use of extranets and intranets is evident in Ngai et al. (2008) study, which found that large companies had well-established facilities such as intranets and extranets to access the required personnel information quickly and efficiently. Moreover, Robison's et al (1999) study confirmed that HR intranets were not widely used, and was limited to online publishing and internal job postings.

The use of extranets and intranets is evident in a study by Al-Jarrah and Yaseen (2007) who found that all public universities had network infrastructures connecting different buildings with each one, and that universities have had significantly improved their IT infrastructure and the connectivity among themselves over the past years. In addition, they stated that there was a gigabit network that connects all public universities together and with other institutions in the community. Their study recommended that the use of the Internet and the email should play a more effective role within the Jordanian universities. Moreover, Al-Zoubi et al. (2007) concluded that the backbone infrastructure of IT seems adequate in Jordanian universities in terms of supporting staff to access online services.

Intranets found in Jordanian universities are particularly popular, in part because they can be quite simple to implement. In addition, they provide a common interface for universities' staff (academic and administrative) and allow access to current internal applications from multiple platforms. In addition, intranet access systems increase the opportunities to utilize electronic-form software. They also reduce the costs of data entry used by HR staff at each university for the purposes of payroll, benefits administration, training administration, etc. Employees at Jordanian universities increasingly become responsible for updating electronically their databases and downloading forms needed to execute the tasks' requirements.

The Jordanian Government has taken some aggressive measures towards building Internet awareness in the country and has passed directives to make computer education compulsory in the elementary school system. Currently, the Internet is easily accessed and many Jordanians have Internet access at home or work. The Internet is considered a way to advance in life in general, and as a career advancer in particular. In order to facilitate the public access

to the Internet across at all levels of Jordanian citizens, Information Technology Community Centers (JITCC) have been established in a number of places. They serve all individuals that need access to the Internet. Jordan has one of the highest rates in the region for having Internet cafes where Jordanians can access the web with minimal fees and without having to purchase Internet services or personal computers. There are about 10 specialized training centers providing Internet courses, where most of these centers are Microsoft Certified. Also, Oracle and IBM educational courses have been offered in Jordan since 1995.

7.3.3.There are Different Types of Human Resources Information Technologies in Jordanian universities

This study has found that there are different types of HR information technologies in use in Jordanian universities. This is supported by Al-Jarrah and Yaseen (2007) study that public Jordanian universities are equipped with the required computer hardware to sustain the operation of their computer centres. One type of these technologies is 'Integrated HR Software' applications. These applications are described as integral solutions to the HR problems. Universities need to use such applications to provide access to larger databases through a variety of modules that automate the different HR sub-functions. In addition, these applications enable the interaction between the IS available in HR departments and other information systems used at the different units and centres of the university (e.g., registration, library, and financial information systems).

It was also found in this study that the most frequently adopted information technology was manager self-service (MSS) applications, which were used by all universities studied. By using these applications, HR managers at the universities are no longer in need to interact with HR staff in order to enquire or view any information about the staff at the university.

Another type of self-service applications is Employee Self-Service applications (ESS). It was found in this study also, that these applications are used moderately. By using these applications every one of the university's staff (academic and administrative) can directly, without the HR personnel, update their individual records, register online for training, manage job openings or view their performance evaluations, health benefits, pensions, etc. The need for HR employees to act upon each and every transaction that involved its domain has been drastically reduced by the use of ESS and MSS applications. The use of employee self-service applications is evident in Castelino (2005) findings, which revealed that employee self-service applications are becoming accepted as the norm. These applications allow a greater opportunity to reduce HR overhead costs and increase perceived service level.

This study found that the least frequently adopted technologies were the Interactive/ Automated Voice Response (IVR/AVR) systems, which were used in the nine universities studied. The little use of IVR/AVR applications is consistent with Florkowski and Olivas-Lujan's (2006) findings that IVR was among the least prevalent technology used by the companies surveyed despite being a more mature technology than HR extranets and HR portals. By contrast, Hoffmann & Hoffmann (1998) study found that IVR systems are prevalent in the firms surveyed. Similarly, Farrell (1996) found that IVR systems are used to automate human resource functions such as benefits administration, employee data updates, and employee verifications at the companies studied. The possible reason for this result is due to the fact that developing and applying new and more advanced information technologies at the Jordanian public universities requires additional and considerable budget and financial resources. The Jordanian public universities' budgets are located among different activities with different priorities.

Jordan has achieved considerable results in providing access to education at all levels, nevertheless it still faces many challenges as it continues to strive for economic and social development in the information technology age. The Jordanian education system is reforming at all levels to respond to these challenges and to contribute to the development of Jordanian human resources by improving the effectiveness of the educational and training systems to keep up with socioeconomic requirements. This will strengthen the role of higher education in sustaining the links between economic growth and the ability to gain and apply knowledge.

When comparing between the specifications and features of HRIS found in the nine universities surveyed, it was concluded that Jordan University ranked as the first university among other universities to have the highest degree of specifications and features of HRIS. One possible explanation for this finding is that this university is the oldest one in Jordan, and the biggest one in terms of number of students and staff (academic and administrative). While Al-Hussein Bin Talal University was viewed by the respondents to have the least rank among the universities studied regarding the specifications and features of its HRIS with a moderate degree. One possible explanation for this may be that this university, was founded in 1999 in the south of Jordan, and it is still in need of more efforts by its management to develop its capacities and get more advanced information technologies to help in performing its various services to students and staff. Moreover, unstable management and continuous change of top management at this Jordanian university, causes unavailability of clear vision or written plans or specified strategies that could be used in the planning and developing process of HRIS.

The Information and Communication Technology (ICT) revolution, accompanied by changes in society, have placed great pressure on higher education institutions and universities in Jordan to create efficient infrastructures to handle the continued growth in the numbers of

incoming students while ensuring the delivery of high-quality education. There is a continual need to improve IT infrastructure and develop innovative approaches to quality of teaching and managing IT-dependent services.

Jordanian public universities, however, still need to provide stable, robust, secure and efficient in-campus infrastructure with sufficient network bandwidth, while strengthening its availability and reliability and providing remote access to campus resources. In addition, high-bandwidth and secure network infrastructure that supports wireless communication and fast Ethernet connections to all units at the university are major technically valuable facilities which should be provided in all campuses to facilitate easy internet connectivity and providing online services to university's staff.

Universities in Jordan face serious challenges such as accommodating the socio-economic developmental requirements of the country as well as responding to the increasing demands on higher education. Major efforts have consequently been made in a number of public universities to integrate IT in teaching systems and in managerial and organizational operations.

7.3.4 Information and Communication Technology and Educational Reform in Jordan

In 1989, a proposal to develop and strengthen the Information Technology (IT) sector in Jordan was established by a core group of members of the Jordan Computer Society. A national plan for educational reform in Jordan was created, in part involving the introduction of ICT in Jordanian schools. The plan was launched in two phases, the first (1989-1995) aimed to develop teacher training, general examinations, new curricula,

educational technology, school buildings, restructuring the educational system, and vocational education and training. The second phase of the plan (1996-2000) was designed to accomplish educational reform in the fields of staff development, assessment, school-based innovations, technical and vocational training, pre-school education, and non-formal education. Thus, the use of ICT in classrooms was one of many important goals set for Jordanian educational reforms.

As a result of such reforms, the REACH Initiative was consequently introduced as a comprehensive framework for widespread IT development in Jordan in general. REACH is an acronym that stands for; *R*egulatory Framework, *E*nabling Environment (infrastructure), *A*dvanced Programs, *C*apital and Finance, and *H*uman Resources Development (Information Technology Association of Jordan, 2004). The REACH action plan and strategy was developed through consultation with and technical support from the Access to Microfinance and Improved Implementation Policy Reform (AMIR) project of the United States Agency for International Development (USAID). The Ministry of Education in Jordan was given responsibility for the project due to its responsibility for the education of more than 1.5 million students—over one-third of the population—in addition to its indirect involvement with higher education institutions such as universities, community colleges, and human resources training centers. The MOE is considered to be the largest user of IT in Jordan.

According to the REACH Initiative, launching Jordan's software and IT industry, Jordan shall become a regional IT leader and internationally recognized exporter of IT products and services, exploiting its core human capital advantages. In 2001, the Jordanian MOE declared three initiatives to be implemented in cooperation with the World Bank, international

organizations, and the international and national private sectors by 2005. These initiatives involved school connectivity, basic teacher training, and teacher professional development training (World Economic Forum, 2001). The REACH Initiative (2001) focused also on the importance of the private sector in playing the fundamental role in developing and providing ICT services to enable a small country like Jordan to compete internationally.

More specifically, the goals of the REACH initiative were to: 1) Provide computers to 500 schools not funded under the World Bank and Spanish and Canadian governments' loans, 2) Provide basic computer literacy training to 25,000 public school teachers via the Intel Teach to the Future Program, wherein all teachers were to receive 102 hours of computer training over a period of four years in order to complete the International Computing Drivers License (ICDL), 3) Provide advanced teacher professional development in the integration of technology in the classroom, including the use of tele-collaborative projects and curriculum development to teachers in Jordan's 807 public secondary schools via the World Links program. The World Links program uses four 40-hour modules to train teachers in the integration of technology in the classroom. These teachers were to represent a core of master trainers who, in turn, would train additional teachers nationwide to build a native skill base in technology.

In 2003, the MOE reported that more than 1,650 schools were equipped with PCs, networking, and basic peripherals in more than 1,724 school based computer labs. About 1,100 secondary schools, selected from different directorates were to be connected to the Internet by the end of 2003, as part of an agreement between MOE and the Jordanian Telecommunication Company (JTC). Other public schools were to be connected thereafter at

the rate of about 200 schools per month in an effort to achieve full connectivity of all public schools by December 2003. In addition, four schools were to have video conferencing facilities (JMOE, 2003). Moreover, the success of the REACH Initiative depends on the ability of the private sector to play an active role in developing a reliable ICT industry that according to ESCWA report (2007) led to (a) the creation of 20,000 jobs in the ICT sector within supporting sectors; (b) 100 million dollars worth of exports; (c) 170 million dollars in foreign direct investments by 2004. By this time, the Jordanian Ministry of Education had become intensely aware of the importance of focusing on factors associated with human capital development as a means of preparing Jordan to take part in future knowledge-based world economies. The government of Jordan placed this notion of enhanced human resources as the highest priority for the country, as evidenced by His Majesty's presence and active participation in many high-profile education and ICT forums.

7.3.5 Current status of Information and Communication Technology (ICT) in higher education sector in Jordan

The Jordanian government realizes the importance of using advanced information and communication technologies in developing the higher education sector in Jordan and forced drastic reforms to introduce information technologies in higher education institutions. Given the rapid expansion of higher education (in both public and private sectors) over a relatively short span of time and other constraints, higher education in Jordan is overwhelmed with prevalent issues of modest quality, lack of relevance and pertinence to economy, inefficiency, governance and administration, and inadequate financing and financial mechanisms. While meeting the pressing social demand for university degrees, the higher education system plays a critical role in the transformation of the education system launched by the government.

At the same time, universities are required to participate proactively and more effectively with the industrial sector in the development of value-added IT industries, trade and commerce and other sectors of the economy including the service sector, e-governance and civil administration, and to gear themselves to conducting high quality, priority applied research.

Using advanced information technologies and better features in HRIS will lead to improving the quality and relevance of the services offered by HR departments at Jordanian public universities. Accordingly, this will enhance Jordan's human capital and increase economic productivity, thereby increasing the higher education sector's capacity to compete with international educational institutions.

Higher education in Jordan is part of an international system of education which is faced with many challenges, and affected by many related changes and factors such as continued globalization, demographic structure, volatile social and economic climate, the essential need to improve quality of different services rendered to employees, meet and maintain accepted international standards by using advanced information technologies. All these factors have combined to create tremendous pressure on higher education institutions' executives to create highly flexible and innovative strategies to perform. Managements at public universities should recognize the importance of using IT as a key element in achieving more effectiveness in their different managerial operations and activities.

The Jordanian government seeks to develop the field of information technology in relation to higher education. It aims to develop a long-range national strategy for information technology in higher education, to build the capacity in basic Web technology skills for

the development of universities' staff, and to introduce well-respected international standards for certification of basic computer. Jordan has drafted national IT strategic plans and policies to move forward with IT in higher education. The Higher Education Development Project (HEDP), funded by the World Bank in 1999, the national strategy for ICT in higher education (2003), and the National eLearning strategy are few of the initiatives and projects that have already been implemented. The main objectives of HEDP are: i) to initiate improvements in the quality, relevance, and efficiency of Jordan's higher education; ii) to support the government program to reform the higher education system; and iii) and modernize the administration and governance of the higher education sector. The HEDP is stipulated to achieve its objectives through the implementation of some sub-projects. Among these sub-projects are: establishing a system-wide modern information technology (IT); designing management information systems (MIS); training faculty staff, and setting a library infrastructure for higher education.

Information technology network: The project stipulated to finance the installation of a robust, standards-based information technology infrastructure, including hardware, software, and applications; inter- and intra-university connectivity; and global connectivity through the Internet to provide students and faculty access to national and global research data and information, and the ability to collaborate electronically with educators on both national and global levels. The network infrastructure includes high-speed fiber optic lines, a mix of shared and switched network technologies, and various application servers. In addition, the Universities have been linked together (Inter-University Connectivity) through a high speed network using fiber optic cables already in place. The infrastructure is crucial to the success of other components/sub-components of the project, such as the Library System and MIS.

The project also includes the establishment of computer proficiency courses, mandated as a required 3-credit hour course for all undergraduate students, regardless of academic discipline. The investment includes the set-up of computer classrooms, audio/visual equipment, furniture, etc.

Management information systems (MIS): The project supports the design and use of modern management information systems (MIS) integrating all necessary modules (e.g. educational data, financial information, physical inventory, and human resources) needed in decision-making by the HEC and MoHESR as well as providing adequate data and system compatibility to link up with the statistical systems of all public universities. The data provided by the universities are processed in the MoHESR. This component finances computer equipment, printers and software for the MoHESR Secretariat and workstations for universities; and training for MoHESR and university staff. Moreover, the MoHESR has recently launched an initiative to develop a consolidated strategic view for clear IT policies in the higher education systems with the objective to create a climate that allows effective resource allocation and utilization, improved efficiency, optimized operational costs and improved educational outcomes.

In 2005, a project was launched by the Ministry of Information and Communication Technology (MoICT) to draft a National ICT Policy in Higher Education. This policy comprises directives addressing themes such as Management Information Systems, IT infrastructure, and management of IT resources at higher education. Moreover, this policy support the design and the use of modern MIS that integrate all necessary modules required

to make informed decisions at the operational, university management, and national levels of the higher education system.

7.4 Question three: What is the extent of applying Human Resources Information Systems in HRM functions at Jordanian public universities?

This study revealed that HRIS are applied for the automation of various functional HRM activities in Jordanian public universities in different degrees. The findings of this study regarding the application of HRIS in HRM in Jordanian Public universities have revealed the following issues:

7.4.1. HRM plays a significant role and is important for economic reforms in Jordan

Improving public sector management effectiveness requires a more proactive role by HR managers. Traditional HRM practices are becoming outdated since it has not been changed significantly over the years. What is needed to improve the public sector is a more modern Human Resource Management that is part of the strategic decision-making of organizations. Jordan started to put a national plan for socioeconomic development in November 1999 when King Abdullah II met representatives from Jordanian private and public institutions in a brainstorming economic forum in order to outline the future strategy of the Jordanian economy. They concluded that their country had to face up to the globalizing powers of business by developing a sustainable economy based on private-sector-led information and communications technology (ICT), on tourism and on export-oriented growth (see Branine and Analoui, 2006). Therefore, as a result, a Council for Economic Consultancy, including representatives from the Government and private-sector employers, was established in order to envisage the implementation of the new economic-reform strategy. The success of

the privatization process was seen as a key factor to the successful implementation of the reform strategy (Branine and Analoui, 2006). The recent economic reforms in Jordan have resulted in considerable changes in the human resource management process.

7.4.1.1 Privatization

The Jordanian economy is in general owned by private entities, although most of the private enterprises are small in size. The economically strategic companies, such the Royal Jordanian Airlines, the Telecommunications Network, the Mining Industry, and Electricity and Water Supplies Authority, were under government control until the recent phase of privatization. Enterprises of public sector were under budget constraints, which encouraged their managers to engage in wasteful and inefficient projects. According to Anani and Khalaf (1989), most public-sector enterprises suffered from overstaffing, politically motivated pricing policies, weakness of monitoring and controlling systems and insufficient accounting procedures. Therefore, there was an urgent need for reforms and, hence, privatization.

While the privatization process began in the 1980s, major sales of public-sector entities did not take place until the late 1990s. The lack of private capital investment from within the kingdom was the main reason for the delay in the privatization process. Private owners did not have enough capital to buy large companies, and the idea of buying shares was, to a great extent, unfamiliar to the Jordanian public. The Government had to make substantial changes in ownership laws, regulations of buying and selling processes, taxation and legislations of banking and employment in order to build the right and suitable environment for private investments.

The Jordanian Government issued Resolution No. 1173 in July 1996, to set up an executive privatization unit in order to formulate a strategy for the implementation of the privatization programme. The privatization of public-sector enterprises was expected to improve efficiency and competitiveness in the various sectors of the economy and to increase the level of private investments and as well as attracting foreign investments, technology and expertise. Most of state-owned and large companies were sold to foreign investors because they had been given the same rights as the domestic ones and it had been made easier for multinational companies to invest in Jordan.

In addition, the government established an independent Investment Promotion Corporation in order to deal with all investment applications and to issue investment licences. Other facilities such as tax reductions and customs duty exemptions have been used to encourage local and foreign investment. Corporate tax was reduced, and imported capital equipment and spare parts were made free from customs duty. Foreign companies can send home their capital, profits and any income from the sale of a project or stock without delay in convertible currencies.

The most noteworthy privatizations had been the sale of the Telecommunications Network Company and other main public companies, following Jordan's accession to the WTO in 2000 and the signing a free-trade agreement with the USA. The reforms have attracted a modest number of foreign investments but they are significant when taking into consideration the size of the Jordanian economy, the limited natural resources available and the unstable peace in Arab region. However, the privatization process resulted in the restructuring and downsizing of many of the newly privatized enterprises, and led to mass

redundancies and increase in the size of unemployment problem. Such changes have created an unusual, uncertain and uncomfortable working environment for many employers (Branine and Analoui, 2006). Many managers were forced to think globally and act locally in an increasingly competitive business environment. In other words, the managers of the privatized enterprises have to apply mechanisms that are suitable to the new market economies, rationalization and cost reduction. The use of HRIS in HRM is more important than any time before.

7.4.1.2.The use of the HRIS reflects the development of a knowledge economy system in Jordan

Educated and skilled manpower base has been the backbone of Jordanian economy. Realizing that the future of national economy lies in successful participation in ICT driven global knowledge economy through the development of competitive value-added ICT industries and eventual transformation of the nation into a knowledge society. His Majesty king Abdullah II sentiments, during the September 2002 Vision Forum for the Future of Education, have been encapsulated as:

> *"The Hashemite Kingdom of Jordan has the quality competitive human resource development systems that provide all people with lifelong learning experiences relevant to their current and future needs in order to respond to and stimulate sustained economic development through an educated population and a skilled workforce."*

Considering that Jordan is a developing country, with middle economy, it should follow up with advanced information technologies in order to survive. One of the main aims of

the current reforms is to make Jordan an "IT Hub" in the Middle East through the development of software and IT services industry. Jordan has witnessed a revolution in bringing in information technology since the year 2000. The development of the information technology sector was selected as having the greatest potential for contributing positively to Jordan's future success. In this respect, a new Ministry for Information and Communication Technology was established order to consolidate the Government's efforts in developing a knowledge-based economy. The creation of e-government and the privatization of the telecommunications network to an international consortium have paved the way for the development of IT culture in the Jordanian society (Branine and Analoui, 2006). The realization of a knowledge-based economy is promising in a highly educated society such as Jordanian society, which is considered to be highly educated and among the most literate in the Middle East. More than 99 per cent of those under the age of forty-five are literate, and the majority of them are competent in the use of English language and computers. The teaching of computing and English language has been made compulsory from Year 1 in primary schools. Thousands of computers are made available in schools to make sure that every Jordanian will be computer literate. The high standard of education in Jordan and the easy access to computers as well as the use of English by most Jordanians have made it possible to set the foundations for an ICT society.

Jordan has a good communication system, with increased use of digital-switching equipment. Internet services are widely available, and it was estimated that in 2004 there were 457,000 Internet users (ESCWA Report, 2005). The recent spread of Internet cafés throughout the country is an indication of an increasing demand in the use of the Internet by the public. By 2000 there were more than 8,000 university graduates in IT-related subjects and more than

2,300 IT students graduate each year. Moreover, the University of Jordan, Jordan University for Science and Technology (JUST), Hashemite University and other Jordanian universities established IT dedicated colleges and are running specialized software development and programming courses all year round. Also, ICT companies such as Cisco Systems and One World Software Solutions have benefited from the REACH initiative to invest directly in Jordan. Attracting more international investments in the ICT industry in Jordan is expected. Moreover, involvement of international agencies such as the United Nationals Development Programme (UNDP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) in developing the Jordanian workforce in advanced ICT techniques is expected to increase. Also, as more and more multinational companies invest in Jordan, the competition for better-qualified employees increases. The IT industry is expected to create high-quality jobs that would utilize the highly educated population and transfer the country to a knowledge-based economy. Although there is a well-educated and computer-literate population, there is a lack of experience and expertise in operating and managing a sophisticated ICT industry. There is a shortage of managers and professionally qualified employees who are able to meet the demands of the current economic reforms. The pressure is not just on training and development but also on the recruitment and retention of a skilled workforce. While there were a number of key milestones in the establishment of the IT sector in Jordan, the impetus came when IT was identified as a key driver for transforming the country into a knowledge-based economy and a potential regional hub in this industry.

7.4.2 Development of HRM in higher education system in Jordan

By 2001, the Government of Jordan was adopting economic and social programmes to accelerate the implementation of economic reform. Policies, programmes, projects and

procedures designed to improve the quality of life for Jordanian citizens were under discussion with both the private sector and multilateral donors. In 2003, the Jordanian government launched its "National Social and Economic Development Plan" (NSED) for the period 2004-2006. This plan consisted of two chapters; the first chapter presented the whole framework of the plan that included policies and objectives of monetary sector, general budget, general debt, and social sector. The second chapter introduced four main social and economic themes, which are; HR development, basic government services, development of governorates and fighting poverty and unemployment, and organizational/ institutional framework and policies.

One of the main targets of the NSED plan was to prepare an HR development plan for higher education sector in Jordan. According to this plan, among the main challenges that face HR development are: the lack of compatibility between output of higher education and requirements of sustainable development; decreasing percentage of investment to improve quality of higher education; deficiency in the financing situation of universities; the weakness of skills of academic staff; and the unavailability of mechanisms that ensure updating and developing educational techniques and tools (UNDP, 2007-2008). Among the policies and procedures that were recommended by this plan are the establishment of specialized performance development centre for both academic and administrative staff at universities and to develop their abilities to use IT in performing their jobs; the provision of economies of education in higher education that include putting the suitable mechanisms to allocate and utilize accessible financial resources in an efficient and effective way and according to priorities; the continuity of additional government support to complete the infrastructure of new established universities and prepare them with advanced and required IT; use of HRIS in

decision making and different management processes to include financial, administrative, supplies administration; and HRM functions systems, modify rules and regulations related to promotion requirements of academic staff at universities, etc.

7.4.3 The use of HRIS in managerial functions at higher education level in Jordan

Higher education institutions in Jordan are playing important roles in helping to develop national competitiveness and development strategies through supporting government with credible research and data on the country itself as well as international best practices. Universities also have a role to play with assisting in licensing of technology, contract research with firms and public research and consulting services to the private sector. Moreover, the use of IT in the classroom and throughout the different management functions in general and in HRM functions in particular holds significant opportunities for increased efficiency in resource allocation. The current MIS system at Jordanian universities covers all administrative departments including Student Information System, Human resources, Finance, Engineering workshops, Inventory and Supplies, Student Affairs, Graduate studies, University centers, Library, electronic exams section, and others.

Jordanian leadership has recognized the central role higher education sector will play in the future economic competitiveness of the country. This high-level support has led to significant attention on the sector and pressure to develop tangible strategies to support and expand its performance. The Jordanian leadership feels the pressure to invest in the higher education sector due to the rapidly increasing enrolment rates of students that have more than doubled in last years.

Human Resources Information Systems (HRIS) are being used with increasing frequency in public universities in Jordan. Increased size and complexity, continued physical dispersion of universities across geographical areas, and government regulation and reporting requirements for universities' employees, are some of the reasons for this increasing utilization of HRIS. In addition, HRIS are of special interests to universities because human resources play a vital role in developing and sustaining competitive advantage for these universities. Human Resources Information Systems (HRIS) are IT software that have the potential to support HR activities such as identifying potential employees, maintaining complete records on existing employees and creating programs to develop employees' talent and skills. HRIS are designed to help organize the myriad of administrative and strategic functions of which the Human Resources department is responsible.

Al-Jarrah and Yaseen (2007) study revealed that information systems and technologies are not fully utilized in Jordanian public universities in areas related to management, planning, and academic processes. It was found in this study that compensation and benefits administration is the highest rated among other HRM functions to use HRIS applications. One possible explanation for this finding is that because of the nature of these activities that can be easily performed by HRIS. Other possible explanation for this finding is that activities that are related to compensation and benefits administration are highly important to public universities. The Finance Department at each university is considered to be one of the main units at the university. It performs different significant tasks, beside its core activities, such as participating in preparing future university plans and annual budget project; preparing overtime work lists for academic staff; collecting classifying, analyzing statistical information about various universities' activities related to students or/and staff (academic

and administrative), and issuing this information in periodical brochures; and preparing a comprehensive annual report about all universities' activities and achievements of its organizational units and submitting it to the University's Council and Trustees Council for approval. In addition, the Finance Department participates in analyzing, updating and developing methods of work and administrative procedures, and studying methods of improving work and increasing its efficiency.

The use of HRIS in compensation and benefits administration function is supported by studies such as that of DeSanctis (1986) who reported that compensation and benefits had been the most frequently used HRIS modules. It is also evident in Ahmad and Zink (1998) study, which found that the payroll was the most frequently automated function in Jordanian public sector organizations. In another study by Kavanagh et al. (1990) it was found that financial management activities were ranked first among other HRM activities that used HRIS. Moreover, Ng et al (2001) found that accounting and payroll systems also needed HRIS applications. They found that HRIS allows the payroll department to access large volumes of data quickly, calculating pay, creating pay cheques, producing pay-related registers and preparing tax reports, etc. Also, Bsatt et al (2003) found that HRIS is basically used as a payroll system in the companies they surveyed.

HRIS applications in performance appraisal were evident in Burbach and Dundon's (2004) study, which found that HRIS had been used to a greater extent for performance appraisal function. Moreover, Lin (1997) concluded that performance appraisal was among the most HRM functions that used HRIS in companies surveyed in Taiwan. In addition, Jaradat's (2004) study found a moderate use of HRIS in performance in the Jordanian banking sector.

HRIS help to store data about the various training courses and trainees of university's staff, and the information then collected in databases, about training and development activities at each university. This information can be used to identify skills and training gaps and can be incorporated into e-learning, e-government, and higher education planning in Jordan. Moreover, HRIS help HR managers to analyze demographic data for the trainees to develop training formats for different groups. Also, it helps in the analysis of the relationships between training and performance ratings, and compensation to establish the cost-benefits of specific training types, and in the development of new recruitment practices, and pre-employment tests based on the analysis of training data and the requirements of positions.

The results of this study show that HRIS is used in training and development function but to a lesser extent than compensation and benefits administration. This result is not consistent with the findings of Ball's (2001) study that HRIS applications are seldom used in training activities in the organizations studied. However, this finding is consistent to some extent with that of Burbach and Dundon (2004) study which shows that training and development are among the most commonly used HRIS modules.

This study has also found that HR planning was the least to use HRIS although the process of HR forecasting and planning is supposed to transform input from HRIS analysis and other sources into predictive feedback estimates for future HR and skill requirements. In response to HR forecast communications, HR development can address any talent deficiencies at universities with such methods as employee training or through new HR recruitment. In this context, Sulaiman et al. (1998) also reported that HRIS had been used to a little extent in HR

planning. Moreover, the results of Lee and Cheung's (1991) study showed that only few firms utilized HRIS for HR planning and strategic purposes. The little use of HRIS in HR planning agrees also with Lin's (1997) and DeSanctis' (1986) who reported that HRIS had been less frequent used in HR planning. In Jordan, Jaradat's (2004) study concluded that HR planning was the least among other HRM functions that had used HRIS in its various activities in Jordanian banking sector. Moreover, Al-Jarrah and Yaseen's (2007) study stated that HR departments at all Jordanian universities had almost no strategic HR development plan and that HRIS were used mainly for administrative purposes. They stated that IT systems and technologies were not fully utilized in areas related to HR planning in Jordanian universities. One possible explanation for the little use of HRIS in HR planning is that top management at Jordanian public universities do not encourage the use of HR planning and do not take into account the importance of HR planning for the universities' future aspirations.

7.4.4 Use of Information and Communication Technology in e-employment at the national level

There are many recruitment companies in Jordan, thus ensuring a balance between supply and demand. Some use computer technology such as the Al-Manar Project which is responsible for building human resources data storages, as well as collecting, screening, programming, storing, publishing, and sustaining the use of information through studies and research, and using it as the base for HR decisions and policies. The Department of Statistics (DoS) in Jordan provides Al-Manar with detailed quarterly data on the identity, skills and qualifications of the employed and unemployed in the Jordanian labour market. The DoS conducts an annual employment study and provides Al-Manar with information. The project maintains a database on the employed registered at the Civil Service Bureau and the Social

Security Corporation. Therefore, Al-Manar attempts to increase and improve operation services in the Jordanian labor market, for which it has developed an electronic internet-based operation system that is open to job seekers and allows them to submit their applications. It also gives employers the chance to announce available vacancies free of charge.

Moreover, using HRIS applications in HR recruitment and selection in Jordanian universities is also very common. Advertising vacancies through the university's website vacancies on the Internet is one activity that is performed through HRIS' s applications. Universities use more advanced information technologies in recruitment process such as publishing web site for university's vacancies and the availability of Internet and intranets at these universities, as it leads to cutting costs and saving time of recruiting new staff. The use of HRIS in recruitment and selection function is supported by Tyrrell (1999) who stated that recent shifts in HRIS, coupled with the widespread use Internet, have led to a radically new job search/employee search environment. He added that the development of email, OCR scanners, and web-based application systems had facilitated the automation of recruitment and selection for HR departments. Interestingly, while Burbach and Dundon (2004) stated that HRIS had been used to the least extent for recruitment in the organizations they studied, Ball (2002) found that HRIS was seldom used for recruitment.

7.5 Question four: What are the obstacles facing the implementation of Human Resources Information Systems at Jordanian public universities?

The analysis of data in relation to this question has revealed a number of obstacles facing the implementation of HRIS in Jordanian public universities. The most significant obstacles

are the lack of resources mainly finance because of budget allocations and the different challenges facing the management of higher education.

7.5.1 Budget allocations at Jordanian universities

The total expenditure on higher education in Jordan has been decreasing in recent years due to the decrease in budgetary allocations to public universities. The decline in budgetary allocations to public universities has been due to the cessation of governmental grants and the allocations from the Socio-Economic Transformation Program. It should be noted that revenues collected in the form of taxes, which are earmarked to provide financial aid to public universities, are partially used for purposes other than those for which they were collected. Therefore, the high debited budgets of some public Jordanian universities result in lowering the level of library services, and its lack of adequate and newest books and references (in some universities this situation is found more obviously than others), lack of scientific highly-equipped laboratories, lack of financial support for scientific research by faculty members, lack of opportunities to develop the research and teaching capabilities of faculty members, and lack of financial support for using more advanced information technologies in performing different administrative activities at these universities.

The Jordanian government plays the role of finance provider by subsidizing public universities. The Ministry of Higher Education and Scientific Research represented by the Higher Education Council plays a vital role in regulating the fees for public and private universities. Additional government restraints include the restrictions on hiring international faculty members and the instability of government policy. Education expenditure as a percentage of GDP shows how a country prioritizes education in relation to overall allocation

of resources. Public expenditures on higher education in Jordan derived from three main sources: 1) revenues on imported goods tagged specifically for public universities. These revenues are assessed on the total values of imported goods, and are not tied to rates or amounts of custom duties on imports. 2) Revenues from an earmarked national university tax on various services provided by the government or by utility companies that were formerly governmental entities. Funds collected from both of these resources make up government budgetary allocations. 3) Revenues derived from tagged taxes are not exclusively allocated to higher education as they were intended, as part of these revenues are allocated to other sectors.

The government considers that public universities must be financially autonomous and must master their own expenses to ensure their budget equilibrium. Informally it forbids them even to have recourse to bank loans to cover their deficits. The university funding resources come from many directions; the annual budget, student fees from different programmes, government subsidies (allocations), investments in immovable properties, and consultancy comes from different training programmes holding in its centres, and finally extra aid and donations come from international organizations and institutions (Mubaideen, 2006). Two public universities, Yarmouk University and Jordan University have also benefited over the last years from returns accrued to their investment funds.

However, as this study has found, Jordanian public universities continue to suffer from large amounts of debts in their budgets and lack of financing from government over the last twenty years. Total budgets for all Jordanian universities (public and private) were 379 million JD in 2003, of this amount 289 million JD the budget of the eight public universities, and 90

million JD as a budget for 13 private universities (MOHE, 2003). Between 80-85% of expenditures of budgets of universities cover primarily wages and salaries of universities' staff. The second most important item of expenditures goes to cover the cost of laboratory equipment, supplies and library resources.

Implementing HRIS at universities needs monetary budget. Types of fixed cost related to implementing HRIS and should be considered are costs of hardware, software, computer centre staff salaries, conversion and installation/implementation costs, and on-going maintenance/support costs, and cost of adopting, operating, and maintaining the HRIS. The cost of activities related to getting HR technologies in Jordanian universities is deducted from the general budget of the university.

Moreover, developing software and hardware to be used in HRIS without funding is impossible. According to Beckers and Bsat (2002) the cost of setting up and maintaining an HRIS can be high, which is the main obstacle in implementing HRIS. Similarly, Kovach and Cathcart (1999) pointed out that the lack of money is the biggest barrier to utilizing HRIS in organizations. There should be an adequate budget available at Jordanian universities to be spent on the required IT software and hardware. Unfortunately, there is a shortage of subsidy from the government to the Jordanian public universities. Each university became nearly depending on its own resources to increase its own financial returns. These institutions have to work with limited budget allocated for the development of top priorities such as teaching and learning materials. This makes the process of accessing more developed types of IT more complicated. The lack of financial resources is considered to be one of the most significant

barriers facing the implementation process of HRIS. This study has found that this barrier is evident among Jordanian universities.

HRIS implementation is costly and requires careful planning from top management. In a study by Al-Jarrah and Yaseen (2007), it was found that IT current budget at Jordanian universities did not reflect the need for resource development and training through using advanced information technologies at HR departments. In order to promote the smooth adoption of HRIS operations, it is necessary to first ensure that the universities have the required budgets for setting up and developing HRIS. One possible explanation for the existence of this obstacle in implementing HRIS in Jordanian public universities is that a comprehensive type of HRIS requires a sizeable budget to implement and maintain their operations. Meanwhile, top managements at these universities do not appreciate fully how the HRIS bring the benefits to the university, and many times they are not willing to allocate valuable resources to the implementation to HRIS.

Other possible explanation for the lack of financial resources for adopting and applying HRIS is that Jordanian public universities are increasing in their size continuously, as the number of students increases rapidly and accordingly the number of academic and administrative staff increases. The top managements at these universities work to provide and keep distinguished quality of education services for students, which is considered to be of top priority for them to keep excellent reputation of these universities locally and internationally. Accordingly, considerable percentage of universities' budgets is spent on providing more qualified academic staff, and providing more equipped scientific laboratories and classrooms. In addition, they seek to provide other supplementary services for students such as library and

registration services, entertainment, athletic, and sanitary facilities, and restaurants. All these issues lead to more financial burdens for the limited university's budget, and considered to be of high priority for the top managements of these universities.

7.5.2 Current challenges facing Jordanian public universities

Public universities in Jordan face other serious challenges such as accommodating the socio-economic developmental requirements of the country as well as responding to the increasing demands on higher education. In this respect, one of the key issues is that an assessment should be undertaken of the present status of using IT in performing different activities of Jordanian public universities on the one hand, and the future needs of the economy on the other. As HRIS secure needed information in easy ways, retrieve, review, and use it at any time without wasting time or efforts of HRM staff, Jordanian public universities have to get all the right components and factors to come together to implement HRIS more effectively. Some of the challenges for the implementation of HRIS in Jordanian public universities are as follows:

1) There is an urgent need to raise awareness among top managements at Jordanian universities regarding the benefits of using IT and providing staff in universities with access to infrastructure and not looking at IT as some thing that a limited number of staff will benefit. This study found that the lack of perception of HR staff about HRIS potentials and advantages of applying new HRIS was one of the obstacles in applying these systems. This finding is consistent with Tansley et al. (2001) study that the lack of awareness and understanding of the potential benefits of the HRIS among HR staff is one of the obstacles in implementing HRIS. Also, this result agrees with Kinnie and Arthurs (1996) study which

concluded that a key inhibitor in realizing the transformational potential of IT was that HR staff were not sufficiently knowledgeable to exploit the possible benefits of using a computerized personnel system. In addition, this finding agrees with Rodger et al. (1998) who contend that users and HR staff, who are unaware of the value-added potential of the HRIS system, will lead to the failure in implementing HRIS. Moreover, this finding is consistent with Burbach and Dundon (2004) who found that there was a lack of awareness among HR practitioners about the range of usages and system capabilities from HRIS in the organizations they surveyed.

2) An attitude focusing on long-term value to offset any resistance to change and introduction of new HRIS. As this study found, the fear to change the way HR staff and managers do things was another obstacle of implementing HRIS at Jordanian universities. One possible explanation for resistance to change that is experienced by HR managers at Jordanian universities is the longevity of the typical university workforce, as many HR employees have been doing the same things the same way, year after year, sometimes decade after decade. Even if it is agreed that a new HRIS or upgrade will bring much needed improvements, HR staff will need to make many changes in the ways of doing things. Retooling the workforce not only introduces new technology but more importantly it forces change within existing manual processes as well. Adopting a whole new way of doing things, regardless of the expected advantages, is discouraging for many. The current practices might not be efficient or even effective, but they are familiar and fairly comfortable for the employees performing those tasks. Another possible explanation for this finding is that HR managers at Jordanian public universities view the implementation of HRIS as a clerical activity that does little to enhance HR department's reputation and performance. They believe that it is difficult

for them to see alternative ways or radically different approaches to managing the processes for which they are responsible. They accepted ``how things were done'' and saw this as almost inevitable, and they are doing just fine with their current systems. Accordingly, it is difficult for them to envisage alternative ways of performing activities of HRM, and they also had a vested interest in maintaining the status quo at their departments. Automating functions of HRM at their departments may lead to potentially threatening their managerial positions. They believe that it is much better and less threatening to stick to the status quo especially if they are having long experience in their jobs and positions in an old established university rather than a new established one.

Resistance to change towards the implementation of new HRIS was confirmed in Kavanagh et al. (1990) study that many HR managers resisted applying HRIS in their departments because they thought they were doing just fine with their current manual or semi-manual systems. In addition to Kavanagh et al, this finding is also consistent with Kossek et al. (1994) who found that the higher the positions in the human resources department, the more negative managers become toward the HRIS. HR managers' participation is a critical factor to the successful implementation of HRIS. Moreover, Barratt (2001) confirmed the importance of HR staff's attitudes towards change to be a key factor in implementing IT in HR department. He stated that both HR staff and university management's attitudes towards change profoundly affect how IT was being used on campus and in HR departments. In addition, Mobaideen (2006) concluded that some HR managers at universities did not accept new information technology applications and programmes for one reason, which is "in order not to lose their power and to keep it in their hands". He added that those people have long

experience exceed the age of this new technology, and regulations and laws protect them to do so.

3) Strong process analysis and reengineering efforts. HR managers and staff should cooperate together to determine the required expectations of applying HRIS in their departments. Their profound participation in the stages of HRIS development and implementation is crucial for the success of the systems in HRM. This study found that there is no adequate cooperation and participation of HR managers and staff in formulating the needed HRIS framework that may help them to effectively apply the HRIS in performing their activities. In this respect, Turnbull (1998) points out that HRIS failure rarely has to do with the core software but rather with the users or the design process of the HRIS itself. Similarly, Kavanagh et al., (1990) supported this finding as they concluded that failure to include key personnel in the development and implementation of HRIS is one of the obstacles in implementing HRIS. Moreover, this finding is consistent with Salmon's (1992) study which found that one of the limitations in implementing HRIS is that in its development stage.

4) A reliable project team from computer centre and HR department at each university. There should be a good relationship between HR staff and computer centre in order to implement HRIS successfully. Poor communication between HR staff and the Computer Centre staff was found as one of obstacles of implementing HRIS in Jordanian public universities. This finding agrees with Kavanaugh et al., (1990) who found that there is little dialog between the IS and the HR functions in firms which apparently affect more negatively the use and capitalization of ITs in HR departments. They stated that this lack of communication between the two functions has been identified as one important reason toward the sub-optimization of

IT in HR departments. This result is also consistent with the findings of Castelino's (2005) study that one of the reasons for the failure of implementing HRIS is poor communication between human resources and IS department. She concluded that although the HRIS had established independence from corporate MIS, it had not yet matured to be an independent entity within the personnel area in a large number of firms. Cholak and Simmons (1991) also supported this finding as they mentioned that an HRIS still requires the participation of IS department, particularly in the planning and developmental stages.

5) High level top management support. HRIS development and implementation need to obtain support from top management in order to secure the necessary financial resources as well as support and vision. This study concluded that there is a lack of top management support for the implementation of HRIS. This lack of support constitutes the largest obstacle in applying the HRIS in Jordanian public universities. This finding agrees with Sulaiman et. al (1998) study which revealed that the involvement of top management during the planning and implementation stages of the HRIS was important to its success. Moreover, Kovach and Cathcart (1999) agreed that the support of top management is one of the most important factors for the successful implementation of HRIS. Also, Teo et al. (2007) confirmed that the support of top management was a key factor in adoption and implementation of HRIS.

One possible explanation to the lack of support by top management in implementing HRIS is that since top management cannot see an immediate and direct relationship between HR functions and profit, as they can with capital and fiscal resources, they find investing in HRIS a low priority. Another possible explanation for this obstacle is that top management in Jordanian public universities change regularly (e.g. the president changes every four years for

most cases). Therefore, the philosophy and perception of the top management towards investing in HRIS applications vary also. Moreover, the perceived lack of support might be excused because applying HRIS could be considered by this top management as one of many university's initiatives and not its main activity.

Top management takes primary responsibility for providing sufficient financial support and adequate resources for building a successful HRIS. The lack of financial support and adequate resources will inevitably lead to failure. The result of this lack of interest by top management was that HRIS staff exhibited a lack of confidence and motivation in their roles in developing HRIS. The development and implementation of HRIS require a sizeable budget to be committed to. If the top managers do not understand how the HRIS bring the benefits to their university, they will not be willing to allocate enough resources to their implementation.

6) Exert more effort to improve the skills and experience of HR staff**.** Adequate skills and experience of HR staff is required for the successful implementation of HRIS. This study has found that there is a lack of IT skills among HR staff at the universities surveyed. This finding is consistent with Roberts (1999) who found that the lack of training on HRIS, or more specifically the gap between job requirements and employees' abilities to utilize HRIS technologies, was the main reason that ICT is under-utilized for HR functions. Moreover, this finding agrees with Kossek et al. (1994) who stated that the skill level for HR staff might be strongly related to the variance in attitudes toward the value of HRIS. Also, O'Connell, 1994 supported this finding as he stated that computer skills training for relevant employees helps to achieve optimal HRIS effectiveness. Moreover, Hannon et al (1996) concluded that HR professionals are frequently lacking in skills for HRIS. Also, Kinnie and Arthurs agreed that

the personnel specialists' knowledge, skills and attitudes helped to explain the limited use of advanced IT applications in personnel functions in the organizations surveyed. However, this finding contradicts AL-Jarrah and Yaseen's (2007) finding that HRIS staff at Jordanian public universities had very good skills. In addition, Mobaideen (2006) concluded that one of the most important problems faced by Jordanian universities towards applying information technology and systems was the lack of training for staff to learn the basics of IT competence. He added that Jordan still suffers from both absence of specialized IT institutions, or high skilled staff who are escaping to another institutions with high salaries and wages, even users, who are still suffering from the absence of reasonable laps, hardware, and software, and limited IT resources.

Once the above issues are considered, any obstacles in applying HRIS at Jordanian public university will be minimized. Jordanian universities have to act rapidly to overcome whatever difficulties they encounter regarding the implementation of HRIS.

7.6 Conclusion

Jordan is one of the countries that are known for their limited natural resources. In its efforts to overcome this problem the Jordanian government has given a special importance to the higher education sector in order to develop its human resources, as its distinguished asset, in the development process of the national economy. As a result, the higher education sector has witnessed a dramatic growth in the number of public and private universities, and an increase in the number of students joining different fields of knowledge. Therefore, the use of HRIS provides an electronic database for the storage and retrieval of HR data. HRIS could

be seen as a tool designed to support management in its human resources planning, decision making, administration, and control activities.

Jordan has established the goal of becoming a leader in information technology and economic developments among other countries in the region. Several plans and initiatives have been developed for this purpose. Consequently, Jordan had witnessed a rapid and comprehensive revolution in information technology over the last ten years. Currently, the ICT industry, including computer software, hardware and telecommunication, has had a very effective impact on the economy and strategic development of the country. Not only has it affected the national economy it has also had a vital role in the development of education, public administration, manufacturing, and business services.

Jordanian public universities try to achieve competitiveness in a globalized world, adopt and adapt new information technologies in managing different information services to its academic and administrative staff. HRIS applications in Jordanian public universities are adopted in certain HRM functions such as compensation and benefits administration more than others such as performance appraisal and HR planning. HRIS applications are actually being used for administrative purposes and running day-to-day activities rather than strategic ones in these universities.

The above discussion of this study's results is expected to make a significant contribution to the understanding of the current status, specifications and applications of HRIS in Jordanian public universities, and it offers some contribution to the current literature on HR and IS in Jordan and elsewhere, as explained in details in the next chapter.

CHAPTER EIGHT

SUMMARY AND CONCLUSION

8.1 Introduction

The purpose of this study was to investigate the applications of HRIS at Jordanian public universities and to examine the barriers of implementing HRIS at these universities. In the next section of this chapter the whole thesis is summarized. Section three presents a reconsideration of the research objectives, while section four presents a summary of research contributions. In section five of this chapter the researcher outlined some recommendations to Jordanian universities on how to improve their HRIS application. Section six outlined some limitations of the study. To conclude the thesis the researcher offers some suggestions for further research in section seven.

8.2 Summary of the research

The study has described the current status of Human Resources Information Systems (HRIS) in nine Jordanian public universities. The main themes that have been explored throughout this study were about the management of HRIS applied within Jordanian contexts, the specifications, applications of these systems in HRM functions, and obstacles of implementing HRIS at these universities.

Exploratory approach was selected for this study of HRIS. The research was conducted through surveying of managers, head departments and employees in departments of human resources management at the nine Jordanian public universities. The data of this study were collected through the use of questionnaires designed for all respondents at HRM departments

at these universities. 130 questionnaires were distributed and 95 questionnaires were returned. Out of the 95 questionnaires, 92 were valid for statistical analysis. The response rate was 72%. The collected data were processed and analyzed through the use of the computer software, the SPSS. Ver.15.

Regarding the current status of HRIS at these universities, the results indicated that computer centre plays vital role in designing, and planning HRIS. The human resource management department is one functional area that is increasingly utilizing information technology. The human resource management function increases its use of IT at each university. In the automation stage, IT is used primarily to automate manual systems and reduce the need of personnel to perform routine activities. It was found in this study that human resources departments at Jordanian universities played a major role, along with computer centre, in planning the needs of HR information technologies.

When using technology in HR service delivery, a wide array of software and hardware systems to automate are needed. Telephones, computer networks, CD-ROMs, and wireless devices all play a vital role in improving the speed and quality of HR services consumed by employees, managers, and executives. It was found in this study that Departments of HRM at Jordanian public universities have the needed IT infrastructure (software and hardware and networks) to operate the current HRIS and perform different activities through these systems. Moreover, it was found in this study that other types of information technologies such as intranets, extranets, and internet, are used in HR departments at Jordanian universities with different levels of utilization. Meanwhile Jordanian universities should work always to get the newest and most advanced information technologies as the number of enrolled students

and staff (academic and administrative) increased continuously, and so the complexity of managerial functions performed by the HR staff. Acquiring these modern information technologies at these universities should be done within the limits of the university's overall budget .

Human resource management has experienced considerable automation both through a growth in the establishment of computerized human resource information systems and the adoption of specific applications in such areas as payroll, training, and recruitment and selection. In this study it was found that HRIS modules are used in different functions performed by HR departments at Jordanian universities. These HRM functions are compensation and benefits administration, recruitment and selection, performance appraisal, training and development, and HR planning. It was found in this study that the extent of applying HRIS in HRM functions is moderate among Jordanian universities, except for compensation and benefits administration that uses HRIS with a high extent.

The administrations of Jordanian universities should realize the importance of using IT in teaching and managerial operations in general and HRM in particular. Using advanced information technologies in HRM functions will lead to improve the quality of these services provided by HR departments at Jordanian universities.

Moreover, the study has also confirmed that there are many obstacles in implementing HRIS at Jordanian public universities. It is concluded that the greatest barrier to the implementation of HRIS at these universities is the lack of top management support, and the least cited barrier is the lack of perception of HR staff about the advantages of applying new HRIS in

performing their jobs. Among other obstacles of adopting HRIS at Jordanian universities are related to lack of financial resources to adopt HRIS applications, lack of skills and training for HR staff, and fear of change caused by implementing new HRIS. Jordanian public universities have to implement HRIS more effectively through overcoming any possible obstacles that can hinder HRIS implementation.

Since 1995, the information technology sector in Jordan has been developing quite rapidly and has added considerable value to the country's national economy, including education, public administration, and different kinds of industries. Combining the different elements of computer software, hardware, and telecommunication industries along with a young and well-educated population, Jordan is expected, by the vision of HM king Abdullah II, to be a leader in IT within the regional countries.

Jordan is one of the countries that are known for their limited natural resources. In its efforts to overcome this problem; the country gave a special importance to the higher education sector in order to develop its human resources being its distinguished asset. This will help to benefit from its outputs in the development process to support the national economy. As a result, this sector has witnessed a dramatic growth in the number of public and private universities and an increase in the number of students joining different fields of knowledge. Expansion of higher education has led to a need for improved efficiency in administrative services, along with a greater range and flexibility in degree programmes than currently exists.

Higher education sector in Jordan had witnessed a high and accelerated technological development, and accordingly that was reflected on various practical, educational, and

managerial fields. Adapting and interacting with these high technological advances is urgent need to continue the process of updating and developing higher education system in Jordan..

8.3 Reconsideration of the Research Objectives

The general purpose of this research was to investigate the applications of Human Resources Information Systems (HRIS) in Jordanian public universities. The specific objectives were as follows:

- ***To identify the current status of HRIS in Jordanian public universities.***

This objective has included managing, planning, operating, and maintaining HRIS at Jordanian public universities. The objective has been met and it has been concluded that computer centre at each university is the major responsible unit of operating and maintaining IT used at HR departments. The activity that is jointly performed by HR department and computer centre is planning the needs of HR information technologies. Computer centre at each Jordanian public university is considered to act as information system department at other organizations. It is also concluded that the cost of activities related to getting HR technologies is deducted from the general budget of the university not the budget of HR department. Regarding the time horizon needed for planning HR information technologies, the study found that the planning process occurred on the need base, as there is no periodical planning for this activity.

- ***To investigate the specifications of HRIS in Jordanian public universities.***

This objective was related to the use of computer hardware and software applications to perform HRM activities, beside other related features of HRIS such as security and easiness to use the systems. The objective has been met as the study concluded that departments of

HRM at Jordanian public universities had the needed hardware to operate HRIS and perform different activities through these systems. The study revealed that some specifications of HRIS at these universities were rating high such as the availability of an accurate, updated and comprehensive database for all university staff at HR department, easiness to operate and manage HRIS, and the availability of high level of security system for HRIS, while other features of HRIS such as the use of Employee Self-Service applications (ESS), extranets, intranets are used moderately.

When comparing between the specifications and features of HRIS found in the nine Jordanian public universities, it was concluded that Jordan University was ranked as the first university among other universities to have the highest degree of specifications and features of HRIS as viewed by the respondents, while Al-Hussein Bin Talal university was viewed by the respondents to have the least rank among surveyed universities regarding the specifications and features of its HRIS with a moderate degree.

- ***To study the applications of HRIS in HRM functions in Jordanian public universities.***

This objective includes investigation of utilizing HRIS into various HRM functions . For this study the use of HRIS into five core HRM functions (Recruitment and selection, Training and Development, compensation and benefits administration, Human resource planning, performance appraisal) was investigated. The objective has been met as the research findings indicate that HRIS modules are applied in performing different activities related to the five HRM functions in Jordanian public universities in different degrees. Compensation and benefits administration was found to be the most frequently used, followed by functions of recruitment and selection, performance appraisal, and training and career development.

- ***To identify the barriers of implementing HRIS in Jordanian public universities***

This objective includes an investigation of the barriers of implementing HRIS at Jordanian public Universities. Nine different types of barriers have been identified in this study. The objective has been met and it has been concluded that the nine investigated barriers of HRIS implementation existed with a moderate degree in all the nine universities surveyed. The first ranked barrier among others, was the lack of support by top management of university, while the lack of perception of HR staff about the advantages of applying new IT in performing their jobs, ranked the least barrier among the nine barriers.

These objectives were met through the collection of responses from HR managers and staff to questions related to each objective found in the study. The responses were then analyzed statistically in order to find out if those objectives were met or not.

8.4 Contribution of the Study to Knowledge

The purpose of this study was to achieve a better understanding of applications of HRIS in Jordanian public universities. In relation to this research purpose, the following specific contributions are claimed by this research:

- This research represents the first exploratory study of its kind to offer a description and explanation of the HRIS applications in Jordanian universities. Therefore, it is claimed that this research made an original contribution to our knowledge in the area of HRIS in a Jordanian context. In this respect, this research made a theoretical breakthrough in two grounds, description and explanation of HRIS.
- This research offers practical implications for HR managers of Jordanian universities when they deal with HRM decisions. In that sense, findings of this research could

contribute to the understanding the applications of IT in HRM in other Jordanian universities (e.g. private universities), and other universities in other Arab countries, which are subject to similar circumstances to the universities studied. Furthermore, not only does this research contribute to academic literature on this topic but it should be of value to practitioners in other organizations in Jordan and in other Arab and developing countries.

- The researcher aims to increase further knowledge about using information technology in HRM functions. The researcher also wants to gain knowledge about general issues regarding the utilization of information technology for HR processes in other organizations.
- This study is one of the first academic studies to be written in English language on the subject of HRIS applications in Jordanian public universities. Therefore, the information, the findings, discussions and analysis provided in this study is a contribution to the English literature related to this field. The English researcher may find it a useful and interesting study that can be analyzed further or compared with other foreign studies. It may therefore be considered as a source of inclusive information about applications of HRIS in Jordan. Thus it is expected to add to the current literature on the studies related to the subject of HRIS which is currently under-researched particularly in developing countries such as Jordan. Researchers, academics and practitioners may find this study interesting and useful to their work.
- The findings of this study are of practical relevance to the Ministry of Higher Education and Scientific Research (MoHESR) in Jordan. Officials will find this thesis useful to know about the amount, types of the technological developments, and information

systems that are used in institutions of higher education in Jordan. So that funding for technology and staff development can be optimally directed.

8.5 Recommendations

The following recommendations are based on the results presented and the discussion provided in chapters five and six and after re-considering the research objectives.

- Jordanian public universities should pay attention to the quality of the output of HRIS in terms of data accuracy, suitability, timeliness, and comprehensiveness as it affects the efficiency of performing HRM functions. These universities should work hard to establish a comprehensive information system of data collection on all academic and administrative staff at each university and community activities.
- Necessary training courses should be held to HR staff about the basics of IT competence. Training can be conducted in various forms. It can range from few-days seminars to one or few month courses. Training courses could be held on site (in each university), or outside institutions; e.g. in other academic institutions, or specialized training institutions. These training courses are supposed to train persons at HRM departments at all managerial levels (high, middle and low) at Jordanian public universities, to increase their awareness of the importance of HRIS, and to be well qualified to use these systems. Staff development centres and programs need to be established or activated at these universities, and incentives should be provided to staff who upgrades their performance capabilities. Describing effective methods of training, identifying the training needs, establishing training programs at universities, and evaluating results of training; are some of important issues that should be considered by HR managers. Also, installation of data shows, desktop computers,

display screens and video conference facilities should be available adequately at the university campus to facilitate training activities.

- Top level management at Jordanian public universities should pay more attention to the important role of HRIS in performing the different practices of HRM, especially HR planning and HR training, as these activities are increasing in its importance and complexity among these universities. Awareness of HRIS importance among top management, deans, department heads, and academic staff should be increased through conducting a series of seminars and workshops on HRIS.
- All departments and sections of HRM should use the full capacity of HRIS systems, not only some of it. HRIS should be applied in all aspects and activities of different functions of HRM.
- Top management at each Jordanian university along with HR mangers should concentrate on the strategic part of HRIS and the important role that HRIS can play in achieving the required efficiency of HRM at the universities, especially activating the field of strategic planning.
- Jordanian public universities (together) should cooperate to build integrated HRIS to achieve the desired integration and cooperation between the different practices and activities of HRM, and to maximize the return of these systems.
- HR managers at Jordanian public universities should use HRIS more effectively in evaluating the performance levels among their staff. Accordingly, the results of performance appraisal for the staff could be used as a base for recruitment, selection, and determining the training needs of university's staff.
- Top level management should exert hard and continuous efforts to provide HRM staff at their universities with the newest and most developed hardware and software

that enable the staff to perform different functions at their departments more efficiently and effectively. Increased percentage of the general budget of the university is recommended to be spent to provide the needed hard and soft ware to HRM departments. Top management should provide sufficient financial support and adequate resources for building a successful HRIS at their universities. Accordingly, The Ministry of Higher Education and Scientific Research in Jordan should adopt a policy to increase the public financial resources transfers to Jordanian public universities and to alleviate the financial pressure on public universities in the face of high demand on tertiary education.

- Top management at universities should believe that involvement of HR department during the planning and implementation stages of HRIS is very important, as their support is one of the most important factors in the successful implementation of HRIS. Promotional efforts as well as an action plan to demonstrate the concrete advantages of using HRIS are necessary to be undertaken to insure that HR managers and staff are aware of the benefits that can be achieved from implementing HRIS.
- Jordanian universities should deploy serious efforts to reach the standard levels of international software packages. Top management should work hardly to improve the infrastructure of HRIS. Updating the tools of HRIS; hardware and software programs at Jordanian public universities, such as introducing new portals and web enabled applications to widen the horizon of the institutions that can be linked with the Jordanian public universities, brings new opportunities that never existed before. Moreover, adopting data warehouse concept and online reporting tools are recommended issues. In depth analysis should be conducted to reach generalized

HRIS model processes that satisfy all the demands of Jordanian universities with some minor differences between these universities.

- Jordanian public universities should reconsider the importance of information, and its being an inevitable strategic resource, and this requires putting a vision for the future of what HRIS systems should be and working hardly to develop them. Groups and/or councils/boards must be established at universities to provide this vision to information technology and systems. Examples of these groups/councils could be; IT Council to address strategic IT issues and Deans' Council to address IT investments and partnerships.
- Jordanian universities should build and maintain data storage in a centralized warehouse under the direct responsibility of the MoHESR. Building a centralized higher education data center characterized by security, availability, scalability, and manageability with the highest possible quality and least cost, is of great importance.
- Widening the use of information networks and developing these networks to link all the different units and departments at each university to achieve the easiness of accessing needed information in quick time.
- A special concern should be devoted by top management to computer centre at each university to enable it to perform its vital role in developing, designing and maintaining different IS used at the university, especially HRIS. Required monetary resources should be allocated to computer centre at each university to get the required equipments and technologies, and to appoint the highly qualified staff and IT professionals to increase their effectiveness and efficiency in performing their jobs at the university.

- Information technology strategy should be revised thoroughly by top management at Jordanian public universities, with specifying clear mechanisms for implementation. Precise policies and regulations should be developed to facilitate use of these technologies.
- Top management at each Jordanian university should support the design and the use of modern MIS that integrate all necessary modules required to make informed decisions at the operational, university management, and national levels of the higher education system.
- There are different information systems (IS) that exist at each Jordanian public universities (e.g. Student IS, HRM, Material, Inventory and Supplies Management), any other required IS for each individual university such as International Relations system, Public Relations system and Scientific Research Databank should be developed by these universities.
- Using online reporting tools to provide upper management with aggregated reports will be helpful in this issue.

8.6 Limitations of the Study

Any study, no matter how methodical, has its limitations. Being the first study of its kind in Jordanian public universities, several limitations were inevitable. The following limitations may restrict the generalization of the research results:

- The **first** limitation relates to the lack of relevant HRIS literature in developing countries in general, and Jordan in particular, which is an inevitable difficulty. The researcher had to rely mainly, on western-based publications on the subject of this study.

- The **second** limitation relates to the issue of both obtaining and maintaining access to HR departments which was a real obstacle in Jordanian universities. The researcher had to spend a long time negotiating access and building access and trust with respondents. Reluctance, lack of cooperation, and lack of seriousness, were notorious phenomena amongst the researcher's respondents. The value of research within a Jordanian context is gravely underestimated because many people in Jordan are not sympathized to participate in scientific research as in other societies in developed countries. Also, many of them do not realize the importance of research and its impact on their lives, thus they are not dealing with this issue with great responsibility. Therefore, the researcher had to convince them face to face and explain to them the need to participate seriously in answering the questionnaire, and this created additional pressure on conducting the study by the researcher. In other cases, HR managers and vice managers were busy and not cooperating with the researcher properly and were trying to let other HR staff to answer the questionnaire. The researcher, therefore, had to exert more effort to convince them to fill the questionnaire by themselves by explaining the seriousness and importance of this study for all the Jordanian universities.
- The **third** limitation is that this study focused on public type of universities in Jordan. However, there are other types of universities, which were not covered in this study - namely private and international universities.
- The **fourth** limitation is lack of proper documentation and records available in HR departments at these universities made the tracing of IT usage issues identified within this study a difficult task given the limited time and restricted access. The data collected for this study are based on the perceptions of the respondents. Thus potential and intentionally false

information is beyond the researcher's control. Also, self-reported information might have influenced consistency of responses.

- The **fifth** limitation is that the findings of this study were based mainly on answers from respondents that are staff from HR departments at Jordanian public universities, instead of having more varied sources for collecting data. In spite of this fact, this research design is still of great value, particularly in areas where there is so little is known, as in the case on the topic of this study.

8.7 Suggestions for Further Research

As with most research, this study cannot stand alone and further research is suggested. It is clear that this thesis represents the ground for the HRIS field within the Jordanian context. There are many opportunities for research in this area, based on this study. The researcher suggests that the following research projects can be conducted in the future:

- With respect to this study itself, it needs to be replicated with a larger sample to enhance generalization and precision. Thus, further study is needed to explore the HRIS applications in the other types of Jordanian universities, namely the private universities, so that a deeper analysis can be done for generalization. Also, a study is needed to be conducted including large samples of other types of public and private Jordanian enterprise structures and cases (industry, manufacturing and service sectors). Also research about across-country comparisons would be worth carrying out in respect of HRIS area.
- The findings of the study revealed that Jordanian public universities are not using HRIS to support strategic HRM functions to large extent, such as the function of HR planning. It would therefore be very interesting if future research could be considered towards studying the possibility of using HRIS in strategic HRM. Also, the reasons for not using these

systems for strategic planning, and finding answers to why Jordanian public universities are reluctant to commit time and resources for the implementation of HRIS in strategic HR tasks, should be investigated. This will enable a careful analysis and diligent consideration of HRIS application to strategic HR tasks since a successful execution is rewarded with numerous benefits including improved accuracy, provision of updated information, and costs saving.

- HRIS becomes an increasingly vital component of performing HR functions. Accordingly, researchers must expand their efforts to understand the opportunities and threats that HRIS foster. These systems may be a key enabler allowing HR professionals to balance successfully the competing roles of administrative expert, employee champion, change agent, and strategic partner. There is also a risk that large investments in HRIS will not improve HR professionals' satisfaction or render the SHRM tasks performance a more efficient cost center. This may be outgrowth of low technology-acceptance among intended users, inappropriate technology choices, or other factors. Until more is known, investments in these innovations should proceed with caution.
- It is clear that this study investigated specific topics related to HRIS such as current status, specifications, applications of HRIS in HR functions, and barriers of implementing these systems at Jordanian public universities. Therefore, further research to consider other topics related to the field of HRIS, would be interesting. More research is needed to explore and analyze thoroughly the subject with more details and make sound recommendations on how to improve using and utilizing these systems in Jordanian universities. Suggested topics such as the role of HRIS in strategic human resource management, investment decision at universities in HRIS, benefits of implementing HRIS at universities including improved accuracy, provision of just-in-time information, cost savings, etc. Also, a study

that will examine various organizational and environmental factors at the Jordanian context, that are affecting the implementation process of HRIS at different organizations, specifically the universities in Jordan, can be conducted in the future. Regarding the obstacles that render the implementation of HRIS at universities, this study examined just few obstacles , other factors such as cultural, organizational, and environmental, low technology acceptance among intended users, and inappropriate technology choices, the role of HRIS to achieve competitive advantage for universities are worth to be examined in further studies.

- Another future possibility is to conduct the same study in another country and to compare the results between Jordan and that country, to figure out the common cultural, technological, organizational, structural, strategic, and any other related factors that may cause differences in the adoption of HRIS from one country to the next.
- This study can be repeated not only with HR managers and staff, but also with the end users (academic and administrative staff) who can benefit from using these systems to get access to online HR services at these universities. This study can help in finding out the users' perceptions, interests and opinions regarding using HRIS and the services it provides.
- The current study was conducted in a specific period of time and under specific conditions. Jordanian universities are always having new technologies and new methods to improve their services to their staff. Top management at these universities change from time to time and this affect the decisions about investing in IT. So, changing conditions at these universities requires conducting further studies in different contexts regarding the continuous changing conditions. So, the findings in this study can be strengthened and expanded by replicating this study at a different point in time. A follow-up study can be

done in a few years time to see if new IT is used in the universities surveyed, if the extent of HRIS adoption is greater or if the HRIS is used for more strategic purposes. In addition, factors influencing the HRIS adoption decisions can be examined. A longitudinal study is also recommended for research on the impact of HRIS on organizations as impacts are often time-dependent (i.e. IT impacts can be assessed more appropriately after a certain amount of time has elapsed since its adoption and implementation).

- Case study approach can be used in further research in the field of applications of HRIS at these universities . As using this approach will give more detailed and clarified results regarding the subject of study.
- More research can be conducted to investigate the relationship between some demographics and the implementation process for HRIS. As this study did not include the effect of the demographic variables of the respondents on the domains of the study, further research could examine, for example, if there is any effect of age, gender and marital status on the applications of HRIS.
- Since results may vary in the case of using different types of IT in HRIS, the current study included few types of information technologies that are used in HRIS, while other types are not included. Further research regarding the new information technologies used at these universities would be useful as information technology is considered to have a great effect on the specifications of HRIS that are implemented in these universities. Future research can perhaps examine thoroughly the adoption of specific newest types of IT. Meanwhile, some information technologies studied in this research were found to be used in little scale, while others are used extensively by the Jordanian universities. Future research may focus on those used more frequently and may expand each technology into more extensive sub-categories.

- Future research can also incorporate alternative ways of measuring the impact of HRIS adoption on organizations. For example, system effectiveness as measured by user satisfaction and system usage or system efficiency as measured by cost efficiency can be used to measure the perceived impacts. Alternatively, financial measures such as profitability and return on investment can be used to evaluate the impact of the adoption of HRIS. A longitudinal approach to study the adoption of IT would be also valuable to investigate IT adoption over time and determine influential factors as well as the impact of adoption on university financial performance. As advanced IT become more and more critical in the universities' context, it would be essential to examine the financial performance as a result of IT adoption

The above proposals are just few of many suggestions for further research and investigation that need to be conducted in Jordan and elsewhere. Generally, the researcher hope that this thesis will stimulate other researchers to conduct further research on such a big and important field of HRIS.

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Appendix 1

Table 2.1 Types of Human Resource Information Technologies (HRITs)

HRIT Type	Descriptions/Purpose	Features	Typical Activities Facilitated for End-Users
HR Functional Applications	Software-enabled automation of discrete tasks & responsibilities assigned to the HR function	• Available before the other HRITs . Absence of unifying standards across software products	• Talent management (e.g., posting, testing, applicant tracking, career planning, HR forecasting, scheduling) • Performance Management (e.g., performance appraisal, needs assessment, e-Learning, pay structure design & maintenance, incentives administration) • Stakeholder Management (e.g., compliance reporting, grievance administration)
Integrated HR Software Suites	Collection of HR functional applications sold as a unit	• Ability to share data among applications • Each functional application is full-featured & can stand alone	
Interactive Voice Response (IVR) Systems	Phone based, software-enabled tree or menu structure that allows callers to access work-related information and/or input data via voice or telephone-keypad commands	• Electronic voice mail . Data-entry capabilities to facilitate select HR activities or to respond to company surveys	• Accessing company announcements • Benefit-plan enrollment • Training registration • Applicant testing & basic biodata collection • Employment/income verification by authorized external parties
HR Intranets	Private computer network that provides employees with direct access to linked internal databases and/or a seamless interface with the Internet	• Based on TCP/IP standards . Online publishing of policies, handbooks & forms . Online postings of job vacancies	• Reviewing personal information in HR databases • Online tracking of retirement-plan performance • Online investigations of potential health care providers for benefit plan elections • Researching job availability as a precursor to applying

Employee Self-Service Applications (ESS)	Software-enabled set of HR transactions that can be initiated and completed by company employees, without direct involvement by HR staff	• Highly configurable regarding the range of automated HR transactions . Role -constrained access to specific HR transactions	• Directly updating personal information in HR databases • Online competency testing and training registration
Manager Self-Service Applications (MSS)	Software-enabled set of HR transactions that can be initiated and completed by company managers, without direct involvement by HR staff	• Highly configurable regarding the range of automated HR transactions . Role -constrained access to specific HR transactions	• Creating, tracking, & managing open job requisitions • Granting base-salary increases and tracking decisions against approved budget
HR Extranets	Private computer network that information systems of client-fi external vendors delivering co- or Outsourced HR services	• Based on TCP/IP standards • Firewalls restricting external access to shared HR data • May incorporate available HR-XML protocols	• Updating personal information changes in databases administered by external vendors • Online oversight of health benefits, pensions, etc.
HR Portals	Web-based interface that offers a personalized, unified access-point to all information sources, tools, and system individuals need to effectively consume or deliver HR services	• Based on TCP/IP standards • Role-constrained access to data stores, applications & systems • Pagelets that group related activities, information & applications	• Accessing channel-based web resources to identify information, tools and vendor listings addressing particular life needs • Online shopping for discounted offerings from a pre-configured network of external & service vendors

Source: Florkowski and Olivas-Luján (2006), "The diffusion of human-resource information-technology innovations in US and non-US firms", *Personnel Review,* Vol. 35, No. 6, pp. 9-10.

Appendix 2:

Table 2.2 Previous studies on Human Resource Information Systems

Researcher	Research purpose(s)	Respondents	Key Result (s)
Ball (2001)	• Prevalence of HRIT categories	• Executives & managers in UK companies • Most in HR (n=115)	• At least 50% reported using applications in 9 HR activities • Firm size was associated with the presence and functional configuration of these kinds of applications • smaller organizations are less likely to use HRIS • Training and recruitment are used less frequently in HRIS • HRIS are used for administrative ends rather than analytical ones
Beckers & Bsat (2002)	• Conditions for the company's HRIS to offer a competitive advantage	Not applicable (N/A)	• Offers a framework linking the company's strategy with the HRIS as a Decision Support System • Identifies some criteria to evaluate whether the HRIS provides a competitive advantage to the organization
Broderick and Boudreau (1992)	• Fit between the company's strategy and types of HRIS	N/A	• Cost leadership objectives, best supported by transaction processing/ reporting/tracking systems • Quality/satisfaction strategy, best supported by expert system applications • Innovation strategies best supported by decision support systems.
Burbach & Dundon (2004)	• Use of HRIS associated with people management activities in Ireland	HR managers of 3000 privately owned enterprises in Ireland (n=520)	• larger and foreign-owned organizations are more likely to utilize HRIS than Irish-owned or smaller firms. • The most commonly used HRIS modules are employee information, training and development, and payroll and pensions. • Over a third of organizations that use HRIS integrate their HR-related technologies with other enterprise systems. • There is a lack of awareness among HR practitioners about the range of usages and system capabilities from HRIS. • In over 90% of respondent organizations HRIS are under-utilized

Continued/ Table 2.2 Previous studies on Human Resource Information Systems

Researcher	Research purpose(s)	Respondents	Key Result (s)
DeSanctis (1986)	• Status of HRIS in firms . Governance (MIS vs. HR), technological base, HRIS usage, planning modes, satisfaction predictors	HRIS Managers & others within personnel, compensation and benefits (n=171)	• Most HRIS at that time were based on mainframes (82.3%) • HRIS as a subunit reported to HR or related areas -no longer to IS function • In addition to compensation/benefits, other sub-areas using HRIS included compliance, planning, recruiting, and training • Satisfaction with HRIS correlated positively with the number of HRIS applications, time to develop the HRIS, HRIS responsibilities, HR involvement during development, and integration with corporate area
Haines and Petit (1997)	• Antecedents for HRIS "success" • HRIS Success conceptualized as User satisfaction and System usage	HRIS user members of the Canadian Association of HR Systems Professionals (n=152)	• User satisfaction and System usage, uncorrelated • User satisfaction negatively predicted by education level and work experience, and positively related to the Presence of an HRIS unit, In-house training, Documentation quality, On-line applications running, Ease of use, Usefulness, Flexibility, and Perception of increments in personal productivity
Hannon, Jelf and Brandes (1996)	. Status of HRIS in firms	Executives in charge of the HRIS (n=11) in US based multinational corporations	• 3 international approaches to HRIS emerged: integrated, blended and ad hoc • Executive support for the HRIS is necessary • Various HRIS stakeholders must be considered, particularly HR professionals, as they are frequently lacking in skills for HRIS

Researcher	Research purpose(s)	Respondents	Key Result (s)
Hoffmann & Hoffmann (1998)	• Characteristics of HRIS sub-functions	Very large, multinational firms (n=24)	• HRIS responsible for most IT responsibility in HR; IT only supports hardware and systems to a larger extent • IVR prevalent in those firms, but moving toward web-based ITs • Large dependence on mainframes
Kavanagh, Gueutal & Tannenbaum (1990)	• No research questions; a guide to all aspects of an HRMS	N/A	• A good description of the HRIS of the early 1990s
Kinnie & Arthurs (1996)	• Examines uses and personnel applications of IT	HR executives in Europe co. (231 mail survey) & (4 case study) Total n= 235	• Most uses of IT in personnel functions are concerned with transaction processing, reporting and tracking. • The use of IT by personnel specialists remains largely unfulfilled. IT skills and knowledge of HR specialists partially explain under-utilization of IT The presence of a personnel specialist was significantly associated with the use of a HRIS
Kossek, Young, Gash, and Nichol (1994)	• How users respond to the implementation of an HRIS	Key employee groups' responses to HRIS (n=150) From corporate and field locations, across levels and areas of one large energy firm	• Varying degrees of resistance found in implementing an HRIS • Face-to-face seminars better influenced favorable intentions to use the HRIS • Typology of four HRIS reactions: (a) Computer Jock Phobia, (b) Gradual Automators, (c) Corporate HRIS Resisters, and (d) Information Brokers • The HRIS symbolized HR's attempt to become more strategic • HRIS expected to enhance the roles played by HR staff • The HRIS changes power dynamics and communications • HR managers would not use the HRIS directly

Researcher	Research purpose(s)	Respondents	Key Finding(s)
Legge (1989)	• Potential impact of IT on personnel-related functions	N/A	• The increasing presence of microelectronic technology in organizations raises issues including job design, organizational design, employment, careers, and training • Personnel's involvement is often late, peripheral, and reactive • The gap between the importance of ITs to personnel management and its characteristic involvement is examined
Martinsons (1994)	• Benchmarks the use of IT in HRM activities in Canada & HongKong	HR executives in Canada (n=118) & HongKong (n=361) Total (n=479)	• 84% of Canadian firms reported using computerized HRIS, compared to 67% in Hong Kong • 15% of the firms in Hong Kong projected having a computerized HRIS within 3 years, compared to an additional 9% for those in Canada • larger organizations make more use of IT for HRM than smaller ones
Mathys and LaVan (1982)	Studies the current stage of development of HRIS	Fortune 500 companies n=105	• 40% of organizations do not have an HRIS • The use of HRIS for career planning and development was ranked lowest, while payroll and accounting was ranked highest
Murdick & Schuster (1983)	Determines the extent to which HRIS is employed in HRM functions	Companies from Moody's Industrials Manual and Moody's Financial Manual	• Many personnel departments lag behind in terms of both planning for and implementing HRIS

Continued/ Table 2.2 Previous studies on Human Resource Information Systems

Researcher	Research purpose(s)	Respondents	Key Finding(s)
Mcleod & DeSantics (1995)	Studies the current status of HRIS	Members of the Association of HR systems professionals (n=513)	• The HRIS of 73.5% of the companies is located within HR dept. • HR applications (e.g. recruiting, compensation) are widely used in the respondents' companies either in a standalone manner or as part of the core HRIS
Ng, Skitmore & Sharma (2001)	Aims to improve the understanding of HRIS construction and purpose of information and the type of data they seek from the system.	Australian Construction companies (n=3)	• 23 HR activities were identified and grouped into seven major functions; 1)project management and control,2) strategic planning, review, and analyses, 3) employee profile, 4) employee performance,5) human resource development,6) payroll and accounting, and 7) information systems outside the company. • The HR information for each function was established.
Palframan (2002)	• HR Technology plans, strategies, trends, and challenges	Campbell Soup, Cemex, Electricity Supply Board, Heineken, Manpower, and Pricewaterhouse Coopers (n=6)	• Considers HR technology plans and strategies of some major organizations represented on The Conference Board's North American and
Rodger, Pendharkar, Paper and Molnar (1998)	. Re-engineering the HR function by means of an HRIS	HRIS users (n=69) and company executives (n=10)	• More improvements to the reengineering process needed • Users found several features not user friendly . Users generally satisfied with content and frequency of reports

Continued/ Table 2.2 Previous studies on Human Resource Information Systems

Researcher	Research purpose(s)	Respondents	Key Finding(s)
Tansley, Newell & Williams (2001)	. Extent to which an HR module of an enterprise system is a "philosophical break with the past"	HRIS project team members	• The HR system was not implemented at its full potential • The HRIS was for most participants a simple automation of the current process, instead of changing the process to capitalize on the advantages offered by the system • Lack of support from senior management discouraged the HR implementation
Ulrich (2000)	. No research questions; suggests ways to transform HR through technology to become a "strategic partner'	N/A	• Customer closeness implies getting very familiar with details of the individual customer's needs • Moving from value chain to value networks of suppliers will enhance marketers' capabilities
Walker (1993)	• No research questions; a guide to several aspects of an HRIS	N/A	• Fine description of the HRIS of the early 1990s; included reengineering concepts, and a focus on cost -justification

Appendix 3: Questionnaire on the Applications of Human Resources Information Systems (HRIS) in Public Jordanian Universities

UNIVERSITY
of
ABERTAY DUNDEE

Dear Participant

I am a research student at the University of Abertay Dundee (UK) studying for the degree of PhD on a thesis entitled "***The Applications of Human Resources Information Systems (HRIS) in Jordanian Public Universities***". This study aims to improve the use of HRIS in Jordanian universities and has implications for the application of HRIS in other sectors of the Jordanian economy. To achieve this aim I need to collect data through the use of the attached questionnaire.

I should be very grateful if you would be so kind as to participate in this survey by taking just a few minutes of your time to complete the questionnaire by answering as many questions as possible. All answers will be held in the strictest confidence and will be used for research purposes only. Your time and effort are very much appreciated.

I thank you in advance for your valuable cooperation.

The researcher

Fawzieh Masa'd

University of Abertay Dundee (UK)

Questionnaire on the Applications of Human Resources Information Systems (HRIS) in Public Jordanian Universities

Section One: Personal information of HRIS's users:

Please put (√) symbol in the appropriate boxes for the following paragraphs:

1. Age
   - ☐ less than 25 years
   - ☐ 26-35 years
   - ☐ 36-45 years
   - ☐ above 46 years

2. Level of Education
   - ☐ College Diploma or less
   - ☐ Bachelors' degree
   - ☐ Masters' degree
   - ☐ Doctorate

3. Managerial level
   - ☐ (general?) manager
   - ☐ Head department
   - ☐ Vice (or assistant) manager
   - ☐ Employee

4. Years of experience in HR department:
   - ☐ Less than 5 years
   - ☐ 6- 11 years
   - ☐ 12-17 years
   - ☐ More than 17 years

5. Years of experience in Information Systems:
   - ☐ Less than 5 years
   - ☐ 6-11 years
   - ☐ 12-17 years
   - ☐ More than 17 years

Section Two: Information about current status of HRIS (planning, designing, operating, and maintaining HRIS)

6. Which of the following departments have the main responsibility for the operation and maintenance of HR information technologies?
   - ☐ HR department
   - ☐ Computer Center at the University
   - ☐ Joint Computer Centre & HR

7. Which of the following departments are responsible for the development and design of HR information technologies?
   - ☐ HR department
   - ☐ Computer Center at the University
   - ☐ Joint Computer Centre & HR

8. Which of the following functions is responsible for setting up specifications and standards for computer software for HR-technologies?
   - ☐ HR department
   - ☐ Computer Center at the University
   - ☐ Joint Computer Centre & HR

9. Which of the following budgets is charged for the cost of activities related to HR information technologies?
   - ☐ HR department's budget
   - ☐ Computer Center at the University
   - ☐ General budget of the university

10. Who participates actively in HR information technology planning?
   - ☐ HR department's staff
   - ☐ Computer Center's staff at the University
   - ☐ Joint Computer Centre and HR staff

11. What time period does your department use for HR information technology planning? technologies?
   - ☐ One semester
   - ☐ One year
   - ☐ No specific time

Section Three: Specifications of HRIS

No	specifications	No use	Limited use	Moderate use	Extensive use
12.	A fully integrated HR software is used in HR departments for functional activities (e.g., selection, appraisal, etc. so that HR activities are computer aided)				
13.	HRM is having the needed information technologies (technical facilities/ hardware) for operating HRIS.				
14.	HRIS are characterized by enough speed to get access to required information at the appropriate time.				
15.	HR Intranets are used that link different HR departments together				
16.	Employee self-service (ESS) HR applications are used in HRM departments (e.g., paycheck services, financial services)				
17.	Manger self-service (MSS) HR applications are used by HR managers (applications oriented toward supervisors rather than employees, e.g., salary, succession management)				
18.	HR Extranets (Internet connections that link HRM at your university with other local universities and educational institutions) are used at HR departments				
19.	Interactive/Automated Voice Response (IVR or AVR; telephony-based) systems are used for HR-related transactions (e.g., salaries, training registration, etc.)				
20.	The related information and technical specifications for HRIS are documented and indexed in a user manual that can be referred to by users of HR departments				
21.	HRIS are easy to operate and manage its software applications by HRM staff				
22.	There are clear and documented procedures and steps on how to get access to all related information for all university staff				
23.	An accurate, updated, and comprehensive database for all university staff is available at HR departments				
24.	There is coordination between HRIS and other MIS at different units and departments of the university				
25.	HR department has a security system for HRIS that allow access to HRIS only to authorized users				

Section Four: The extent of using HRIS modules by HR department

Please put (√) symbol in the appropriate boxes for the following paragraphs:

	HRIS modules (Applications)	No use	Limited use	Moderate use	Extensive use
First: Recruitment and Selection:					
26.	Job vacancies are advertised through the university's website on the internet				
27.	CV's of job candidates are received and then scanned by HRM through using HRIS				
28.	List of job candidates (e.g., their names, scientific qualifications, experience)can be prepared through HRIS				
29.	Written exams for job candidates can be designed, prepared and corrected through using HRIS				
30.	The data related to job candidates can be exchanged between HRM and the unit which has the vacancy				
31.	HRIS help in internal selection process by using staff data bases at the university				
32.	The advertisements of the university scholarships and receiving the applications of candidates is done through the university websites				
33.	keeping databases about students who had scholarships from the university and currently studying abroad				
Second: Training and Development:					
34.	HRIS help in specifying the training needs of university staff				
35.	Computer software is used in designing and preparing the periodic training programs needed for university staff				
36.	HRIS is used in evaluating to what extent the trainees had benefited from the training programs they attended				
37.	Information technology is used in presenting the different training programs				
38.	HRIS can help in training university staff through E-learning programs				
39.	HR staff is being trained and prepared for using the new HRIS before starting of implementation				
Third: Compensation and benefits Administration					
40.	HRIS help in preparing a clear system of salaries and benefits according to data collected from local labour market				
41.	HRIS help in preparing the monthly transcripts of salaries and benefits for the university staff				
42.	There is a data base of employees' salaries and necessary changes can be made on this data				
43.	HRIS help in preparing periodic reports about salaries of university staff to be used for other purposes (e.g., preparing university budget)				
44.	HRIS help university staff to know ,directly, information about their health insurance				

HRIS modules (Applications)		No use	Limited use	Moderate use	Extensive use
45.	HRIS can be used to know the date and degree of expected promotion, the date of renew/terminate the work contract of university staff				
46.	Necessary information about the university rules and regulations (e.g., promotion, retirement) is available in HRIS				
47.					
Forth: Performance Appraisal:					
48.	HRIS is used in evaluating the individual performance for each of the university staff				
49.	HRIS help in collecting and analyzing the results of current performance appraisal for the university staff				
50.	HRIS help in collecting and analyzing the results of performance appraisal for the university staff in the past years				
51.	HRIS help in comparing between levels of employees' performance in different units and colleges of the university				
52.	HRIS provide top management at the university with reports about the results of performance appraisal related to staff				
53.	HRIS link between the results of the employee's performance appraisal and giving him the appropriate incentive				
Fifth: Human Resources Planning					
54.	There is a clear HRIS to determine the needs of HR for various departments of the university				
55.	Information is exchanged between HR departments and other departments and units at the university to participate in HR planning				
56.	HR plans are reviewed and adjusted periodically according the updated data about university budget				
57.	HRIS can help in preparing analytical study about cost and efficiency of needed staff of university				
58.	HRIS can help to predict future needs of HR (quantitatively and qualitatively) at the university				
59.	HRIS can help in preparing HR strategic plans for the university				
60.	HRIS help in analyzing related data from external environment when formulating HR plan at the university				

Section Five: Barriers to the implementation of HRIS at your department

	Potential barriers	Not a barrier	Little barrier	Moderate barrier	large barrier
61.	Lack of support of top management of university				
62.	Satisfaction of HR managers with the status quo (Fear to change the way HR staff and managers do things)				
63.	Lack of HRIS's knowledge, skills and training of HR staff				
64.	Insufficient financial support for HRIS by the university				
65.	Poor communication between HR staff and the responsible department for supplying HRIS (e.g. Computer Centre)				
66.	Lack of commitment and involvement of HR employees in developing HRIS at their departments				
67.	The inflexibility and difficulty of implementing the HRIS by HR staff				
68.	Lack of perception of HR employees about the advantages of applying new HRIS in performing their jobs				
69.	There are no suitable software packages available at HR department in applying HRIS				